

# LOUDOUN COUNTY BICYCLE AND PEDESTRIAN MOBILITY MASTER PLAN

*DRAFT*

*Note to Reviewers: In an effort to keep this document a manageable size so that it could be sent via email, we have not included photographs in this initial draft.*

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# Acknowledgements

Under construction . . .

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# Chapter 1: Executive Summary

Bicycling and walking are popular activities in Loudoun County both for transportation and recreation. Walking and bicycling are pleasant and enjoyable activities in a number of residential developments throughout the County that were built with sidewalks, street trees, and paved trails. The Washington and Old Dominion Trail is a well used and cherished resource that links most of the County's new communities and historic Towns.

In many places, however, travel by foot and bicycle is difficult in Loudoun County. Pedestrians face many physical barriers in the public right-of-way, including discontinuous sidewalks, dangerous road crossings, high speed traffic, and sidewalks that are blocked by poles, fire hydrants, and other obstacles. There are no bike lanes in the County, and often neighborhood bike paths are narrow and winding, and do not connect to destinations. Choosing to bicycle or walk is often not a safe or convenient option.

Loudoun County recently doubled its population in ten years (1990-2000) and continues to be one of top ten growth Counties in the nation. This rapid growth in population in such a short span of time has taxed the transportation system, and County residents and elected officials are concerned that bicycling and walking conditions are deteriorating considerably.

In July 2001, the Loudoun County Board of Supervisors called for completion of a Countywide Bicycle and Pedestrian Mobility Master Plan to address these issues. This Plan is the result. It is the product of many hours of work by a Citizen Advisory Committee and numerous ideas and recommendations made by the residents of Loudoun County.

This Plan identifies many locations that are in need of improvements such as new sidewalks, bike lanes, pathways, and intersection crossing improvements. The Plan focuses primarily on the existing road

network. Although facilities such as the W&OD Trail are ideal, there are few remaining abandoned rail corridors that can be used to build off-road trails.

In addition to developing safer roads and intersections for bicyclists and pedestrians, the Plan calls for the development of a variety of other programs that support and encourage more cycling and walking. More County residents will bicycle and walk for short trips if mixed-use development becomes more common, secure bike parking is provided at destinations, and bike safety and promotion programs are developed. As new bike lanes and sidewalks are built throughout the County, school-based pedestrian safety and traffic law enforcement programs will be needed as well, to teach everyone how to share the road safely.

These new initiatives should be started soon to ensure that bicyclists and pedestrians will be able to use the future roadway network that is slated to be built over the next 10 -15 years. The County is not alone in this initiative. The Virginia Department of Transportation (VDOT) is taking increased interest in planning and funding bicycling facilities as part of its congestion relief and air quality improvement efforts. And the Federal transportation programs have been providing a consistent source of funding for these activities for the past ten years.

## 1.1 Why is Bicycle and Pedestrian Mobility Important to Loudoun County?

There are a variety of reasons bicycling and walking issues are important to Loudoun County residents:

### Health Benefits

*Bicycling and walking can play a vital role in improving the health of Loudoun County residents.*

- Research conducted in 1999 by the Centers for Disease Control found that "obesity and overweight are linked to the nation's

number one killer – heart disease – as well as diabetes and other chronic conditions.” The report also states that one reason for Americans’ sedentary lifestyle is that “walking and cycling have been replaced by automobile travel for all but the shortest distances.” (October 1999 issue of the JAMA - Journal of the American Medical Association).

- In Virginia, the prevalence of obesity increased by 100% between 1991 and 2001, going from 10 percent to 20 percent in ten years.
- Total costs attributed to obesity (medical costs and lost productivity) amounted to an estimated \$117 billion in the year 2000, 10% of total national health care costs. Poor nutrition and physical inactivity account for some 300,000 premature deaths in the United States each year.
- Studies have shown tremendous health benefits for even a brief amount of light exercise (such as walking) each day.

### **Transportation and Safety Benefits**

*Bicycling and walking are a necessary part of the transportation system in Loudoun County.*

- Bicycle and pedestrian facilities are needed to form important connections between activity centers, population centers, employment and shopping areas, parks, trails and tourist attractions.
- Many people in Loudoun County need an alternative method of travel to the automobile. The combination of children, youth, low-income residents, recent immigrants and retirees means that a significant portion of the population may not have access to a car. Bicycling and walking is an extremely affordable option when compared to the expense of owning and operating an automobile (\$150 per year compared to over \$5,000 per year), especially in a County with minimal public transit services.
- According to surveys conducted locally and nationally across the nation anywhere from 40 - 60% of Americans say they would like to walk or ride a bicycle to work or for other errands if it was safe and convenient to do so.

- Already significant numbers of people are walking and bicycling in certain locations that are not as safe as they can and should be. Improving intersections, completing sidewalks, and providing highway overpasses will reduce the potential for bicycle and pedestrian fatalities and injuries from crashes with motor vehicles.

### **Environmental Benefits**

*More greenways and increased levels of bicycling and walking will help to improve air and water quality in Loudoun County.*

- Loudoun County is classified as a serious non-attainment area for ground level ozone by the U.S. Environmental Protection Agency. This means air quality in the County is below federal health-based standards for clean air. Motor vehicle pollution is a major contributor to ozone pollution.
- Increased levels of bicycling and walking can play an important role in reducing air pollution: By substituting a bicycling or walking trip for short auto trips, area residents can significantly reduce the amounts of pollutants generated by automobiles. Shorter auto trips produce far more pollution per mile than longer trips.
- Trails and greenways can serve a dual purpose of offering an alternative transportation route while also preserving critical open space corridors in urban and suburban areas. Greenways filter stormwater run-off, remove pollutants from the air, and provide migratory routes for animal species.
- More trips exchanged from motor vehicle to bicycling and walking will mean better air quality and fewer non-point source pollutants in Loudoun County, which will help to improve the health of the Potomac River and Chesapeake Bay.

### **Economic Benefits**

*Developing trails, bikeways and walkable communities makes good economic sense for Loudoun County.*

- Businesses tend to invest more in locations that have a high quality of life, and corporate employers have an easier time attracting good workers to these locations. Loudoun County’s ability to retain its status as a first class employment location will depend on its perception as a high quality place to live.
- Bicycle tourism is big business in the United States, bringing millions of dollars in revenue to some parts of the country. For example, in Vermont, bicycle touring brings in more revenue than the maple syrup industry. Loudoun County has already gained national recognition for the W&OD Trail and its beautiful rolling hills, horse farm country and historic Towns and villages. It is clear that bicycle tourism should become a key feature of the County’s tourism strategy.

### Quality-of-Life Benefits

- Providing a livable community is a necessary part of attracting and keeping businesses, keeping our best and brightest young people here at home, and ensuring that Loudoun County remains competitive in the 21<sup>st</sup> century. Bicycling and walking are integral to the image of Loudoun County as a safe and welcoming community that values children, fresh air, life and leisure.

## 1.2 Summary of Vision and Goals

Loudoun County’s vision for bicycling and walking provides the public, elected officials, county staff, and others a clear picture of the future transportation network. The specific goals speak directly to the particular areas of emphasis that need action. Together they provide a solid framework for the recommended actions in this Plan.

### Vision Statement

*Loudoun County – a place where pedestrians and bicyclists of all abilities have a safe, secure, and convenient alternative transportation network of walkways and bikeways that enable everyone to move efficiently to and from such places as work, school, transit, shopping, libraries, parks and recreation.*

To realize this vision the Committee established five goals, which follow:

#### Connectivity:

*Develop a comprehensive walkway, bikeway and shared-use path network among residential neighborhoods, Towns, workplaces, shopping centers, transit stations, historic districts, schools, libraries, recreation centers, parks, etc.*

#### Diverse Users:

*Accommodate the widest possible range of use abilities.*

#### Education & Promotion:

*Educate public officials, business and community leaders and the general public.*

#### Safety & Security:

*Increase the levels of bicyclist and pedestrian safety and security.*

#### Funding for Construction & Maintenance:

*Ensure adequate funding for construction and maintenance of the pedestrian and bicycle network and related facilities.*

A complete version of the goals and objectives is provided in Chapter 2.

## Key Recommendations of the Plan

This Plan recommends the construction of a physical network of bikeways and walkways, as well as a variety of programs and policies that are needed to achieve the vision and goals identified above. Detailed recommendations are set forward in Chapters 5-9. Below is a summary of the key recommendations of the Plan:

- 1. Establish policies to support full inclusion of pedestrian and bicycle facilities during road construction and development/redevelopment projects.**

A primary recommendation of this Plan is to incorporate a wide variety of pedestrian and bicycle provisions into the standard development and road construction process. Achieving this is critical to the success of this Plan, and will require considerable staff coordination and consultation with VDOT and the development community. Chapter 5 provides detailed recommendations regarding what types of policy changes are needed.

- 2. Establish a network of bikeways and walkways that connect neighborhoods with activity centers and recreational destinations.**

The Network Map in Chapter 6 identifies a long-term vision for a network of bikeways and walkways that extend throughout all parts of the County. This Chapter includes proposed neighborhood linkages, proposed off-road path connections, future transit access routes, pedestrian improvement areas (“hot spots”) rural bikeways, pedestrian and traffic calming improvements in villages and Towns, and key linkages to neighboring jurisdictions.

- 3. Develop education and safety programs that promote bicycling and walking for transportation and health, and**

**educate pedestrians, bicyclists and motorists on effective traffic safety measures.**

Chapter 7 provides a five-year workplan for initiating safety education and promotion activities in the County. This section of the Plan also addresses security measures for off-road trails in the County.

- 4. Establish an institutional framework to support the implementation of this Plan, which includes both staff support and a permanent Citizen Advisory Body.**

Chapter 8 identifies actions that are needed to provide institutional resources for implementing this Plan, and identifies the roles and responsibilities of a permanent citizen advisory body, as well as staff assigned to program implementation.

- 5. Develop sustainable sources of funding for bicycle and pedestrian program activities, facility construction, and on-going maintenance.**

Chapter 9 identifies a variety of potential funding sources for the projects and programs recommended in this Plan, and establishes actions that will be needed in order to tap existing transportation revenue streams.

The Loudoun County Bicycle and Pedestrian Mobility Master Plan sets forward a comprehensive strategy in order to achieve the goals established in the Countywide Transportation Plan. There is growing support for multi-modal transportation not only among residents of Loudoun County, but throughout the Washington, DC region. Now is an opportune time to begin the implementation of this Plan.

# Chapter 2: Introduction

## 2.1 Plan Origins and Purpose

In July 2001, the Loudoun County Board of Supervisors called for completion of a Countywide Bicycle and Pedestrian Mobility Master Plan. This action was identified as a priority in the Revised Countywide Transportation Plan (CTP) as a component of developing a more multi-modal, and less auto-dependent, transportation system. Citizens and elected leaders voiced their concerns that better conditions for walking and bicycling are needed in order to meet established goals for economic development, environmental protection and historic preservation. Virginia Department of Transportation (VDOT) policy establishes an incentive for local governments to complete bicycle and pedestrian master plans. With an approved plan in place, VDOT will fund up to one-half of the construction costs and all of the planning, design and right-of-way costs for bicycle and pedestrian facilities that are identified in the plan.

The decision to complete a bicycle and pedestrian mobility master plan is also a direct response to public interest and demand. During public meetings held during General Plan and CTP revisions (2000-2001), County residents expressed concerns about deteriorating bicycling and walking conditions. Many people were attracted to Loudoun County because of its quiet rural areas, and the charm of its smaller villages and towns. Others were attracted to

eastern Loudoun communities as safe places for playing children and evening strolls. Many citizens expressed concerns that increasing traffic volumes and speeds threaten the quality of life in Loudoun County.

## 2.2 Regional Context

The adoption of this Plan coincides with a number of regional efforts to improve walking and bicycling conditions throughout Northern Virginia, the District of Columbia and Maryland. Loudoun's Plan is well timed to coordinate with these surrounding jurisdictions, in order to achieve connections that go well beyond Loudoun County's boundaries. The following efforts were either in progress or recently completed during the timeframe of this master planning process:

- **Northern Virginia Regional Bikeways and Trails Study** – a study conducted by Virginia DOT's NOVA District, in order to achieve regional coordination on bicycling issues. It establishes a regional network of roads for bikeway development in Fairfax County, Prince William County, Loudoun County, Arlington County and the City of Alexandria.

- **Maryland Statewide 20-Year Bicycle and Pedestrian Plan** - Maryland DOT completed a 20-year statewide bicycle and pedestrian plan in 2002. It includes recommendations to provide pedestrian and bicycle access across Potomac River bridges when they are replaced.
- **District of Columbia Bicycle Master Plan** - this Master Plan is an update of a previous plan completed in the late 1980's. It establishes locations for future bike lanes throughout the District, as well as a variety of policies and programs to support bicycling.

To the extent possible, the findings of the above-mentioned studies and master plans were coordinated with the planning process for this Plan. The County should continue to work with adjacent jurisdictions to ensure seamless connections to the regional bicycle and pedestrian network.

### 2.3 Scope and Objectives

By CTP policy, the focus of this plan is on the transportation and mobility needs of bicyclists and pedestrians. Within the transportation focus two general goals are preeminent: a) improving the safety of bicyclists and pedestrians using the roadway network and b) increasing the use of bicycle and pedestrian modes for regular and utilitarian transportation. Better access to parks and the existing trail network was a primary objective of the Plan, in order to enable county residents to

walk and bicycle – rather than drive – to these destinations.

Because it is primarily a transportation plan, the recommendations in this report focus on the County's existing and planned roadway network. The recommendations also include a number of potential off-road trail corridors, neighborhood connector linkages, and pedestrian improvement areas. The development of this Plan included the following activities:

- analysis of existing conditions,
- identifying opportunities and constraints,
- involving the public and garnering local support,
- working with local law enforcement on safety and security issues,
- addressing school access and education issues,
- recommending changes to roadway and development policies and regulations,
- identifying facility development priorities and recommending funding strategies,
- solidify implementation mechanisms among responsible agencies and organizations.

### 2.4 Public Participation

Active public participation was a key component of this Plan. The planning process included a number of strategies to encourage significant and meaningful public involvement:

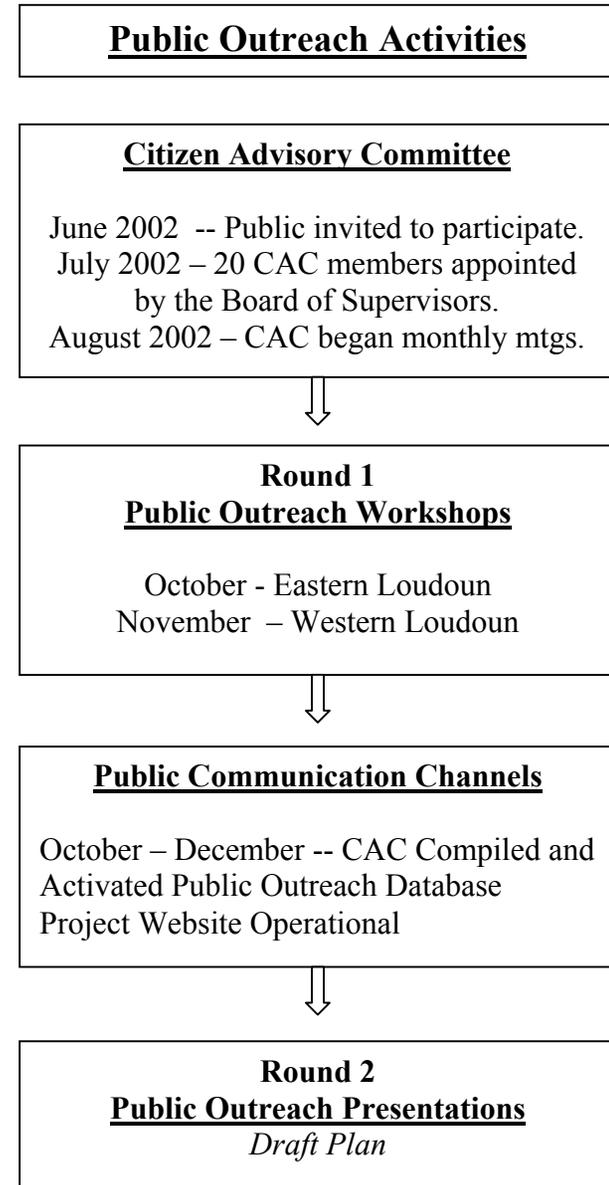
- A formal Citizen Advisory Committee (CAC) was appointed by the Board of Supervisors to participate in plan development and lead public outreach efforts;
- Two rounds of public workshops and meetings were conducted, during which participants were actively involved in identifying needed connections.
- The County website was used to gather public comments and share information as the plan was developed.
- Media outreach was used to generate press coverage and alert the public to the process.
- The CAC developed a public outreach list of individuals and organizations that were kept abreast of the planning process.

The chart at right details the timing and locations of public outreach efforts.

## 2.5 Role of Citizen Advisory Committee

The Board of supervisors charged the CAC with a specific mission: *“to identify project goals and objectives, bicycle and pedestrian mobility issues, specific problem locations, solutions, the ultimate planned network, and priority projects.”*<sup>1</sup> The CAC was extremely active during the 9-month planning process. The group met extensively in order to conduct research, determine the most effective outreach methods, and develop the recommendations of this Plan.

<sup>1</sup> July 15, 2002, Board of Supervisors Action Item



## **2.6 Role of Interdepartmental Advisory Team**

In addition to the CAC, the Planning Department convened a staff team of representatives from a variety of County Agencies including transportation, parks, general services, the Sheriff's Office, development review, mapping and geographic information systems, and others. This team was convened to discuss and offer input on a variety of topics and issues that arose during the planning process.

## **2.7 Conclusion**

The Loudoun County Bicycle and Pedestrian Mobility Master Plan has grown out of public concern for bicycling and walking issues and recognition that they must be addressed primarily as part of the transportation system. The next chapter presents the vision, goals and objectives for this plan.

## Chapter 3: Vision and Goals

At the beginning of the planning process the Citizens' Advisory Committee developed a vision statement and set of goals and objectives for bicycling and walking in Loudoun County. Drafts of these elements were presented to the public at the outreach workshops in the autumn of 2002, and revisions were made based upon the feedback received. The following statement of vision and goals are offered to guide implementation of this Plan and all County policy and actions related to bicycling and walking:

### Vision Statement

*Loudoun County – a place where pedestrians and bicyclists of all abilities have a safe, secure, and convenient alternative transportation network of walkways and bikeways that enable everyone to move efficiently to and from such places as work, school, transit, shopping, libraries, parks and recreation.*

## Goals

### CONNECTIVITY

*GOAL: Develop a comprehensive walkway, bikeway and shared-use path network among residential neighborhoods, Towns, workplaces, shopping centers, transit stations, historic districts, schools, libraries, recreation centers, parks, etc.*

- *OBJECTIVE A: Expand the bicycle and pedestrian network of bikeways, walkways, shared roads and other facilities throughout the county to connect all developments, neighborhoods, and Towns, and adjacent counties and states.*
- *OBJECTIVE B: Incorporate requirements for walkways, bikeways and shared-use paths into all community design and modification, and transportation activities.*
- *OBJECTIVE C: Expand connections of walkways, bikeways and shared-use pathways to mass transit in order to promote the use of both.*

### DIVERSE USERS

*GOAL: Accommodate the widest possible range of use abilities.*

- *OBJECTIVE A: Provide for the needs of bicyclists, pedestrians (walkers, joggers, runners), in-line skaters, disabled persons, children, the elderly, people pushing strollers, and tourists.*

- *OBJECTIVE B: Develop policies that address diverse user needs.*

## **EDUCATION & PROMOTION**

*GOAL: Educate public officials, business and community leaders and the general public.*

- *OBJECTIVE A: Establish a permanent county advisory committee for pedestrian and bicycling advocacy.*
- *OBJECTIVE B: Educate public officials, business and community leaders, and the general public about the values and benefits of walkways, bikeways, related facilities, and associated efforts.*
- *OBJECTIVE C: Promote walkways, bikeways and shared-use paths and related facilities among county residents and for tourists.*
- *OBJECTIVE D: Promote mass transit that supports the use of walkways, bikeways and shared-use paths.*

## **SAFETY & SECURITY**

*GOAL: Increase the levels of bicyclist and pedestrian safety and security.*

- *OBJECTIVE A: Incorporate safety and security related design standards for roads, walkways, bikeways and shared-use paths.*

- *OBJECTIVE B: Educate the public about safe walking, bicycling, and driving rules and practices.*
- *OBJECTIVE C: Increase safety measures along walkways, bikeways and shared-use paths.*
- *OBJECTIVE D: Improve signs for pedestrians, bicyclists, and motorists in shared environments.*
- *OBJECTIVE E: Strengthen laws and other policies to better protect pedestrians and bicyclists.*
- *OBJECTIVE F: Enforce laws concerning the safe interaction of pedestrians, bicyclists, and motorists in shared environments.*

## **FUNDING FOR CONSTRUCTION & MAINTENANCE**

*GOAL: Ensure adequate funding for construction and maintenance of the pedestrian and bicycle network and related facilities.*

- *OBJECTIVE A: Develop sustaining budget and finance programs for construction and maintenance of walkways, bikeways and related facilities.*
- *OBJECTIVE B: Clarify jurisdiction and responsibility issues among town, county, regional, and state organizations.*
- *OBJECTIVE C: Obtain funding from sources outside the County for pedestrian and bicycling improvements.*
- *OBJECTIVE D: Encourage volunteer projects that make pedestrian and bicycling improvements.*

- *OBJECTIVE E: Design for low maintenance.*
- *OBJECTIVE F: Encourage homeowners' associations to adequately maintain community trails.*
- *OBJECTIVE G: Maintain a current assessment of network and facility conditions and report status to the Board of Supervisors annually.*

## **Conclusion**

Loudoun County's vision for bicycling and walking provides the public, elected officials, county staff, and others a clear picture of the future transportation network. The specific goals speak directly to the particular areas of emphasis that need action. Together they provide a solid framework for the recommended actions in this Plan.

# Chapter 4: Existing Conditions

## 4.1 Overview

Loudoun County is located in the Piedmont region of Northern Virginia and is one of four Virginia Counties in the Washington Metropolitan Area. Its landscape includes gently rolling hills and streams in the east with a series of ridges and larger hills in the west. The north and eastern edges of the county is bounded by the Potomac River, and the western edge by the first major ridge of the Appalachian Mountains.

Between 1990 and 2000, Loudoun County was the fastest growing county in Virginia and third fastest in the nation. Population increased from 86,000 to 170,000, a growth rate of ninety-seven percent. This population growth has been facilitated by rapid-paced residential and commercial development, especially in eastern Loudoun around the Dulles Airport and along the Dulles Greenway.

Loudoun's scenic farm country, and historic small towns have long attracted recreational bicyclists and other tourists interested in weekend getaways, antique shopping and exploring civil war history. The W&OD trail is one of the oldest and longest rail-trails in the nation. It connects the heart of the metropolitan Washington D.C. area with its exurban fringe. As such it has become a favorite for

families and serious cyclists alike, as a conduit into the scenic country roads and slower paced life of Loudoun's rural settlements. Loudoun County is also bounded by two other major long distance trails: the Appalachian Trail, which runs along its western boundary; and the C&O Canal Towpath, which is on the Maryland side of the Potomac River. These nationally recognized hiking and biking trails draw tens of thousands of people annually. Many who make outdoor recreation a central part of their lifestyle have been drawn to relocate in the County to gain closer access to natural landscapes and these precious resources.

## 4.2 Current Levels of Bicycling and Walking

Census data provides some information about the current levels of bicycling and walking in Loudoun County. It is important to recognize that this data only addresses journey to work trips, which comprise only 20 percent of all trips. In Loudoun County, the average number of pedestrian and bicycle commuting trips are low - approximately 1.35 percent of all trips, compared to the number of people who drive alone in an automobile to and from work (82 percent). As shown in Table 1, Loudoun is

well below the national bicycle and pedestrian commuting rates and below state averages for Virginia.

**Table 1: Bicycle Commuting and Walk to Work Rates**

Source: U.S. Census 2000

| <u>Jurisdiction</u> | <u>Commute by Bike</u> | <u>Walk to Work</u> | <u>Combined</u> |
|---------------------|------------------------|---------------------|-----------------|
| United States       | 0.4 %                  | 2.9 %               | 3.3 %           |
| -Virginia           | 0.2 %                  | 2.3 %               | 2.5 %           |
| -Loudoun County     | 0.12 %                 | 1.23 %              | 1.35 %          |

Rates of student bicycling and walking to school in Loudoun County are also low: of the 40,000 students that attend public schools, only about 20 percent (8,000) live within the safe-walk zone of their respective school. It is estimated that of those eligible to walk or bike to school, approximately 50-75 percent do so on a regular basis. Many children and youth are dropped off by parents, or live in areas where bus service is provided. More than 50 percent of high school juniors and seniors drive to school or ride in a car with a student driver.<sup>2</sup>

### 4.3 Existing Bicycle and Pedestrian Facilities

As noted above, Loudoun County is home to or in close proximity to three of the nation’s most notable bicycle and pedestrian facilities: the Washington and Old Dominion

<sup>2</sup> Based on information provided by Loudoun County Public Schools Department of Transportation.

Rail-Trail (W&OD), the Appalachian Trail and the Chesapeake and Ohio Canal Towpath. Over its entire length, the W&OD Trail receives 2-3 million visitors a year. This trail is a considerable transportation resource - it is used by bike commuters to get to and from work, as well as by school children to get to schools (see Farmwell Middle School case study in Appendix.) A 1998 study of the W&OD Trail found that twelve percent of trail users on the W&OD use the trail for regular or periodic transportation purposes.<sup>3</sup>

The C&O Canal is a popular recreational resource and can be accessed via White’s Ferry near Leesburg. It can also be accessed from three highway bridges that cross the Potomac into Maryland; however none of these bridges are designed with bicycle or pedestrian accommodations. Linkages to the Towpath, including access to White’s Ferry, are in need of improvement. The Appalachian Trail is purely a recreational resource, however interest in improving access to it via connecting roads and trails was mentioned frequently during public meetings for this Phase.

In recent years, Loudoun County has required residential and commercial developments to include sidewalks, shared use pathways, and/or to proffer land where pathways can be built in the future. In many of the newer suburban residential developments, particularly those developed in the neo-traditional style such as South Riding

<sup>3</sup> Washington and Old Dominion Trail: A Study of Trail Users, March 1998

and portions of Ashburn, the sidewalk system is well designed for walking. Many of these communities include extensive pathway systems as well.

With these notable exceptions, there are few other resources that provide a similar high quality bicycling and walking experience. There are no bike lanes in the County and no signed bike routes. The width and layout of many neighborhood pathways is adequate for walking and jogging, but too narrow for shared use with bicyclists and in-line skaters.

An analysis of 842 miles of roadway (including all of the roads in the CTP) revealed 70 miles of shared use pathway alongside roadways in the County. Of those 70 miles of pathway, only 12 miles are wide enough to safely support shared bicycle and pedestrian use (eight feet or wider). Only 13.8 percent of the road mileage studied included sidewalks. On many of these roads, sidewalks are provided on one side only, or are discontinuous along the entire length of the road.

#### **4.4 Barriers to Bicycling and Walking**

Barriers to bicycling and walking can be identified in two primary categories, natural and man-made. The primary natural impediments are the Potomac River, a number of mountain ridges including Short Hill Mountain, Catoctin Mountain and the Blue Ridge along the Loudoun/West Virginia border. Additionally, the County has a number of large creeks and important stream valleys including

Sugarland Run, Broad Run, Goose Creek, and Catoctin Creek that have limited numbers of bridge crossings.

Man-made barriers are also significant. Primary among them are Dulles International Airport, the Dulles Greenway (Route 267), US 15, US 50, Route 28, Route 7 and the 7 & 15 Bypasses around Leesburg. Loudoun County has very few grade-separated crossings (bridge overpasses) over its major arterial highways and freeways. Most that do exist serve the W&OD Trail. As roads like Routes 7, 28 and 50 have rapidly grown in size, traffic speed and volume, pedestrian and bicycle crossings have become extremely difficult, even at signalized intersections.

Interchanges between arterial roads and limited access freeways are barriers to bicycling and walking. Bicycle and pedestrian access is not provided at interchanges at Route 7/Cascades Parkway, or those along the Leesburg Bypasses. Interchanges along the Dulles Greenway were also reported by the public to be difficult to cross as a bicyclist or pedestrian.

Residential and commercial land development patterns that were common in the past have also created considerable barriers to bicycling and walking. Frequently, the internal roads and neighborhood streets of residential and commercial developments do not link with those of the neighboring development, establishing each new activity node as an isolated pod. Bicycle and pedestrian trips between adjacent developments are made much

longer and more indirect, and require use of roads with heavy traffic volumes. Moreover, many developments are designed to limit access to only one or two locations, which often provide accommodations for only motor vehicles, thus making bicycle and pedestrian access difficult.

#### 4.5 Roadway Conditions for Bicyclists

On the main roads that traverse the County, bicyclists must operate within a transportation system that is designed primarily for cars and trucks. Most roadway cross sections do not include paved shoulders, therefore bicyclists must share travel lanes with motor vehicles. Travel lane widths are narrow on many of the older roads. Traffic speeds are high in many areas of the County. Off-road sidepaths are often not adequately designed for bicycling; they are narrow (less than 8 feet wide), have poor pavement quality, and include frequent curves and undulations that reduce their efficiency for utilitarian travel.

In addition to poor roadway conditions for bicyclists, bicycle parking is lacking at most destinations, including schools, shopping centers, along traditional main streets, at parks and other public facilities such as post offices and libraries. Where bike racks are provided, they are often hidden from view, or are not designed to support the frame of the bike (U-racks are preferred to “ladder style” racks).

During the course of this study, Bicycle and Pedestrian Level of Service models were employed to formally evaluate bicycling and walking conditions on over 700 miles of Loudoun County roadways. These models used measurements of roadway conditions and characteristics that were taken specifically for this Plan in November and December 2002.

**Bicycle Level of Service (BLOS) model:** The BLOS Model is a scientifically calibrated method of evaluating the comfort level of bicyclists on a roadway segment, given existing bicycling conditions. It uses quantitative data to produce a qualitative evaluation. The data includes measurable traffic and roadway characteristics that are familiar to transportation planners and engineers. The BLOS Model is based on standard roadway factors such as:

- Lateral separation between bicyclists and adjacent motor vehicle traffic (measured by the width of the right-most lane)
- Presence and width of a paved shoulder/bike lane
- Volume and speed of motor vehicle traffic
- Percentage of heavy trucks
- Number of travel lanes
- Presence of on-street parking
- Pavement condition (note that unpaved roads did not receive Bicycle LOS grades)

Like the motor vehicle level of service model (a long-used planning tool used in the transportation engineering industry), the BLOS model uses score ranges to assign a

letter grade (A-F) that describes existing conditions. The Bicycle Level of Service grade has been scientifically calibrated to reflect actual bicyclists' user perception. "A" reflects the best conditions for bicyclists; Level "F" represents the worst conditions.

| <u>Level of Service</u> | <u>Level of Comfort</u> |
|-------------------------|-------------------------|
| <u>Score</u>            |                         |
| A                       | <= 1.5                  |
| B                       | >1.5 and <=2.5          |
| C                       | >2.5 and <=3.5          |
| D                       | >3.5 and <=4.5          |
| E                       | >4.5 and <=5.5          |
| F                       | >5.5                    |

Table X shows the percentage of miles with each of the six BLOS grades for the Countywide Transportation Plan network of roads, a total of 355 miles of existing facilities. Over two-thirds of Loudoun County's roads have a bicycle level of service "D" or worse.

**Table X: BLOS Grades for Existing CTP Road Network**

| <u>Bicycle Level of Service</u> | <u>Miles</u> | <u>Percent of Miles by BLOS grade</u> |
|---------------------------------|--------------|---------------------------------------|
| A                               | 31.8         | 9.0                                   |
| B                               | 26.2         | 7.4                                   |
| C                               | 57.4         | 16.2                                  |
| D                               | 83.0         | 23.4                                  |
| E                               | 95.8         | 27.0                                  |
| F                               | 60.7         | 17.1                                  |
| <b>Total</b>                    | <b>354.9</b> | <b>100.0</b>                          |

The primary factors contributing to these conditions are high travel speeds, a lack of roadway space for bicyclists to use, and high traffic volumes in some corridors. Heavy truck volumes on some roads in Loudoun County also play a role in reducing the level of comfort for bicyclists.

#### 4.6 Roadway Conditions for Pedestrians

The availability of sidewalks in the region varies widely. As a general rule, the larger older communities have the best sidewalk systems, and the town centers are pedestrian-friendly. In some areas, sidewalks have been well maintained, while in other areas they are in need of extensive repair. As is the case with many older sidewalk systems, there are many places with no curb cuts for wheelchair access. While gaps in the sidewalk system are common to the oldest and newest of communities, the newer neighborhoods are less likely to be missing curb ramps. Crosswalks are utilized randomly throughout the

county, and a variety of crosswalk striping patterns are used.

Where sidewalks end, worn dirt paths show locations where heavy foot traffic occurs. These paths can be seen throughout the County in all types of communities and settings.

On many roads near schools, special care has been taken to install solar-powered flashing warning lights to warn motorists of the likely presence of pedestrians during school access and egress hours. In some of the older communities, pedestrian tunnels have been built under major roads to provide access to schools or shopping centers. While these grade separations dramatically improve safety from traffic, many of these tunnels have drainage and erosion problems, poor sight lines, steep and narrow approaches with sharp turns, and are poorly lit and maintained. Higher standards for underpass design are needed in order to make these alternate routes safe and attractive.

There are many places where neighborhoods are not connected to nearby destinations with sidewalks, even in places where the destination is less than a quarter mile away. Many schools, especially those built in the past 5-7 years are isolated because they are surrounded by high-speed, four-lane roadways that provide only minimal provisions for pedestrian crossings, and no space for bicycling

**Pedestrian Level of Service (PLOS) model:** The PLOS model was used to assess the comfort level of pedestrians walking along Loudoun County roads (for details, see Appendix C). It uses roadway measurements and inputs that are similar to the Bicycle Level of Service model, and an identical grading scale (see above). It is scientifically calibrated to reflect actual user perception of comfort. The roadway characteristics used by the pedestrian model include the following:

- Sidewalk presence and sidewalk width
- Lateral separation between pedestrians and adjacent motor vehicle traffic (measured by the width of the right-most lane, the width of the bike lane or paved shoulder (if present), and the width of the buffer between the roadway and the sidewalk (if present))
- Volume and speed of motor vehicle traffic
- Number of travel lanes
- Presence of on-street parking
- Presence of street trees and spacing between street trees

Pedestrian Level of Service was evaluated on 735 miles of roadway. More than three-quarters of Loudoun County's roads have a pedestrian level of service "D" or worse.

**Table X: PLOS Grades for Entire Study Network**

| <b>Pedestrian Level of Service</b> | <b>Miles</b> | <b>Percent of Miles by PLOS Grade</b> |
|------------------------------------|--------------|---------------------------------------|
| <b>A</b>                           | 11.0         | 1.5                                   |
| <b>B</b>                           | 71.1         | 9.7                                   |
| <b>C</b>                           | 77.0         | 10.5                                  |
| <b>D</b>                           | 437.7        | 59.5                                  |
| <b>E</b>                           | 129.4        | 17.6                                  |
| <b>F</b>                           | 9.5          | 1.3                                   |
| <b>Total</b>                       | <b>735.7</b> | <b>100.0</b>                          |

## **4.7 Conclusion**

The level of service analysis conducted for this Plan confirms the comments made by numerous residents and elected officials who attended public meetings held during the planning process: there is a great need to improve bicycling and walking conditions throughout Loudoun County. While unsuitable conditions may not be the only factor, certainly, these conditions contribute to Loudoun’s low levels of bicycle and pedestrian commuting. While these conditions may be hampering the amount of utilitarian walking and bicycling that occurs, recreational bicycling and walking retains high participation levels. The evidence gathered in this planning process suggests that County residents would like more opportunities to bicycle and walk for transportation, safer places for recreational riding and walking, and the opportunity to avoid having to drive to their recreational bicycling and walking destinations.

## Chapter 5: Recommended Policies and Guidelines

This chapter recommends a comprehensive program to incorporate appropriate bicycle and pedestrian facilities during the development of each transportation and development project that occurs in Loudoun County. This policy-oriented approach is critical to the implementation of this Plan, as most new bikeways and walkways will be constructed as incidental components of transportation and community infrastructure projects.

### 5.1 Roadway Design Policies

The Countywide Transportation Plan recognizes that “increasing road capacity alone will not fully address the transportation needs of the growing community,” and that an “auto-dominated transportation infrastructure should not dominate citizens’ lives or the landscape.”<sup>4</sup>

To balance the past emphasis on motor vehicle circulation with new concerns about pedestrian and bicycle safety and mobility, new policies are needed in Loudoun County. The following policies are consistent with the CTP and will be applied during transportation project and program development:

- All transportation facilities in Loudoun County (with the exception of limited access freeways) will be planned, designed, constructed and maintained to accommodate shared use by motor vehicles, bicycles and pedestrians.
- Pedestrian and bicycle safety will be of paramount concern on all projects where such access is permitted. Transportation facilities will be designed to improve the comfort and convenience of walking and bicycling.

The intent of these policies are to ensure that all roadways in the County provide for the safety and accommodation of pedestrians and bicycles. It is recognized that in some circumstances, such as in undeveloped rural areas, standard sidewalks are not needed (see section 5.4). It is also recognized that in some developed areas of the county, constraints may exist that make it difficult to provide typical sidewalks and bikeways. Where such circumstances exist, alternative solutions should be explored (including purchase of necessary right-of-way) in order to accommodate these users.

It will be necessary to work in concert with Virginia Department of Transportation, local Towns and villages, and the development community to fully implement these policies.

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<sup>4</sup> Countywide Transportation Plan, July 2001, Chapter 2, Page 2.

## 5.2 Project Development Process

In order to ensure that pedestrian and bicycle facilities provide satisfactory linkages and contribute to system connectivity throughout the County, the following actions should be taken during the development of projects in public rights-of-way:

- Project scoping should include identification of missing sidewalks, sidewalk gaps, and bikeway connections required by the policies herein. Scoping will require a basic field observation to identify pedestrian and bicycle needs. It may be necessary to extend project boundaries to provide continuity to logical terminal points.
- Project concept plans should include existing and proposed pedestrian and bicycle features, which may include proposed sidewalk and bikeway connections, and conceptual intersection crossing measures. Concept plans should identify measures by which running speeds will be kept to reasonable and prudent levels through physical measures such as traffic calming.
- When development proposals are required to evaluate their impacts on existing and future motor vehicle levels of service, they will also be required to evaluate their impacts on existing and future bicycle and pedestrian level of service. Preliminary traffic plans must include bikeways and pedestrian crossing measures.

- Design plans should indicate layout and construction of all pedestrian and bicycle facilities in accordance with accepted national guidelines.
- Construction traffic control plans should include maintenance of an accessible pedestrian and bicycle route through the construction site, whenever an existing route is disrupted.

A critical factor in implementing the above policies is selecting the most appropriate design treatments for pedestrians and bicycles. As with roadway design for motor vehicles, there are several levels of analysis that are needed in order to choose the right type/level of accommodation for pedestrians and bicycles.

## 5.3 Facility Selection for Bikeways and Walkways

In order to determine the most appropriate design treatment for bicycles and pedestrians during roadway design projects, it is important to understand the implications of the County and VDOT's functional classification system upon the roadway under consideration. The appropriate treatment should be based on the current, interim and planned ultimate condition of the road. Key resources include Chapter Three of the Revised Countywide Transportation Plan: *Road Networks* and Appendix 1: *Design Guidelines for Major Roadways*.

The roadway designer must also consider the overall planning context as determined by the roadway's location

within the planning Policy Areas and the approved zoning of its adjacent properties. Finally, the Pedestrian and Bicycle Design Toolkit should be referenced, in order to standardize the approach to key bicycle and pedestrian design issues in Loudoun County.

The following steps should be taken in order to determine the appropriate design treatment during the development of new transportation projects:

1. Determine the type of accommodation - TABLE 1

The ultimate type and level of accommodation will be based on the functional classification of the road under consideration, and the planning zone it is located within. Table 1 provides a general guideline for selecting the appropriate design treatment. For most roadway categories, on-road bicycle accommodations are recommended. There are a number of alternative designs for on-road bikeways (see shadow box on page x). In order to determine what level of on-road accommodation is needed, it is necessary to determine the desired performance of the facility.

2. Determine the desired performance of the facility - TABLE 2

The next step is to determine the quality of accommodation that is desired for the roadway under consideration. At this point, given some basic roadway characteristics, the designer can also make a determination as to the amount of width needed for a bike lane or paved shoulder, and/or the amount of separation needed

between a path/sidewalk and the adjacent road. It is important to note that if the road is a secondary road with low traffic volumes, there may be no need for a “designated” bicycle facility in order to achieve the desired level of accommodation.

3. Design the appropriate cross section

Using the information above, along with the appropriate considerations for motor vehicle level of service, the designer is equipped to make decisions regarding how to balance competing needs in the roadway cross section.

**Table 1**  
**Bicycle and Pedestrian Facility Selection Guideline - DRAFT**

| <b>Secondary Road</b>   | <b>Minor Collector</b>                                  | <b>Major Collector</b>  | <b>Major Collector</b>                                       | <b>Minor Arterial</b>   | <b>Principal Arterial</b>       | <b>Limited Access</b>                        |
|---|---|---|--|---|---------------------------------|--|
| Ex: Sugarland Run Dr.<br>Rt 722<br>2 lane   | Ex: Ashburn Rd,<br>Cochran Mill Road<br>2 lane or multi | Ex: Snickerville Rd,<br>Clarke's Gap<br>2 lane  | Ex: Atlantic Blvd.,<br>Potomac View, Sterling<br>Multi-lanes | Ex: Ryan Rd.,<br>Belmont Ridge Rd.<br>2 lane or multi   | Ex: Rt. 7<br>Rt. 50<br>4-6 lane | Ex. Dulles Greenway<br>Leesb. Bypass, Rt. 28 |
| <b>On-Road Bicycle Accommodation<br/>+ Sidewalks<sup>1</sup></b><br><br>See cross sections for each roadway type, use target Bicycle LOS and Pedestrian LOS to determine facility design. |   | <b>On-Road Bicycle<br/>Accommodation + Off-Road<br/>Shared Use Path and Sidewalk</b><br><br>See cross sections for each roadway type, use target Bicycle LOS and Pedestrian LOS to determine facility design. |  | <b>Off-Road Shared-<br/>Use Path</b><br><br>See cross section for roadway type, use target Ped LOS to determine separation. |                                 | <b>No<br/>Accommodation</b>                  |

<sup>1</sup>Sidewalks on both sides in Suburban Policy Areas, Transitioning Policy Areas, Joint Management Areas, Villages and Hamlets

**Table 2:  
Loudoun County Bicycle and Pedestrian Level of Service Minimums - DRAFT**

|              | Geographic Area  | Minimum Bike Level of Service | Minimum Pedestrian Level of Service | BLOS Exceptions  | PLOS Exceptions                                  |
|--------------|--|-------------------------------|-------------------------------------|--|--|
| Condition 1  | New roads on new ROW, and in new developments throughout the County.   | B                             | B                                   | *C acceptable in certain situations  | *C acceptable in certain situations              |
| Condition 2  | Improvements to Roads and Streets in Developed Areas:<br>--Suburban Policy Areas;<br>--Transition Policy Areas,<br>--Joint Land Management Areas         | C                             | B                                   | *Major Arterials can be D in certain situations; provision of a shared use sidepath is recommended in these cases. | *Major Arterials can be D in certain situations. |
| Condition 2a | Roads and Streets within 1.25 mile Radius of Elementary, Middle and High Schools within Condition 2 Policy Areas and Towns of Leesburg and Purcellville. | B                             | B                                   | *Major Arterials can be C.   | *Major Arterials can be C.                       |
| Condition 3  | Improvements to Roads in Rural Policy Areas that have been selected for the Rural Network.   | C                             | None                                | Highest BLOS that can be achieved or provision of an off-road pathway.   | None   |
| Condition 3a | Designated Bike Route System within the Rural Policy Areas   | B                             | NA                                  | BLOS C and traffic calming, or route must be undesignated.   | NA   |
| Condition 3b | Rural Villages: Aldie, Bluemont, Lincoln, Lucketts, Paeonian Springs, Philomont, St. Louis, Taylorstown, Waterford.                                      | C                             | C                                   | The highest BLOS feasible using traffic calming.   | The highest PLOS feasible using traffic calming. |
| Condition 3c | All roads and streets within a .75 mile radius of all schools within Western Loudoun Rural Policy Area and within rural Towns.                           | B or 5 foot paved shoulder    | B or 5 foot sidewalk                | None   | None   |

Refer to Appendix D for a more detailed explanation of the County’s Level of Service policy, including a description of exceptions that are acceptable to the minimums shown above.

## 5.4 Policy for Provision of Sidewalks

In general, all streets and roads in Loudoun County (other than limited access highways where pedestrians are prohibited) should be planned and designed with pedestrian use in mind. In the Rural Policy Area, outside of settlements, providing sidewalks for pedestrians is usually infeasible, undesirable or not cost effective. However, shoulders and various traffic calming techniques can improve pedestrian conditions along rural roads. In western Loudoun County, rural roads within Town and village settlements, and areas near schools will receive a higher level of attention for pedestrian safety and accommodation.

- a) CTP roads in incorporated Towns and village settlements will have sidewalks, in most cases on both sides, with a minimum width of 5 feet, or striped shoulders of 5 feet (or more, in full consideration of the built environment and historic character of many of these communities.) Physical design measures will be used to discourage speeding.
- b) In the Suburban and Transition Policy Areas, the Joint Management Areas, Towns of Leesburg, Hamilton, Purcellville, Round Hill and surrounding suburbanizing area, and in new villages, the following minimums shall apply:

- Residential streets shall have sidewalks, on both sides (unless there is an insurmountable physical constraint), with a minimum width of 5 feet. Physical design measures will be used to discourage speeding.
- Collectors and arterials should have sidewalks on both sides with a minimum width of 6 feet, unless ROW is limited due to the close proximity of buildings, or locations are within Historic Districts. Roadways that have continuous sidepaths, of a width of 6 feet or greater, shall be considered to have met the minimum sidewalk requirements. Physical design measures will be used to discourage speeding.

## 5.5 Land Development Policies

Loudoun County has made great strides in recent years in achieving higher levels of accommodation for pedestrians and bicyclists during the land development process. Continued inclusion of bicycle and pedestrian design into the land development process is critical in Loudoun County. Important bicycle and pedestrian access issues include access to and through developments, connections to adjacent developments, circulation within development sites and residential neighborhoods. Other important features should include provision of bicycle parking, amenities such as showers and lockers for bicycle

## **Bikeway and Walkway Facility Types**

Following is an introduction of the basic facility types that are recommended within this plan. Design details for many of these facilities and treatments are provided in the Design Toolkit.

### **Recommended Bikeway Types - On-Road**

#### **□ *Shared Roadways***

*Shared Roadways* are those streets and roads where bicyclists may be adequately served by sharing the travel lanes with motor vehicles. Usually, these will be streets with very low traffic volumes and/or low speeds, which do not need special bicycle accommodations.

#### **□ *Striped/Paved Shoulders***

Generally, two feet or more of paved roadway surface that is to the right of the outside lane edge stripe is beneficial for bicycle travel. On urban roads, where there is not enough space for a designated bike lane, striping the vehicle travel lanes to provide two or more feet of paved shoulder improves comfort and safety for bicyclists. On rural roads, any amount of paved shoulder is better for bicyclists. There is no minimum width for paved shoulders, however a width of at least 4' is required for the facility is to be formally designated as a bike lane.

#### **□ *Bike Lanes***

A bike lane is a portion of the roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes are always located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. The minimum width for a bicycle lane is 4 feet; five- and six-foot bike lanes are typical for collector and arterial roads.

### **Recommended Pedestrian Facilities**

#### **□ *Sidewalks***

Sidewalks are the central ingredient of the countywide pedestrian network. Provision of sidewalks along streets and roads should be routine in Towns, villages and in the Suburban, Transition and JLM policy areas. They should be included on both sides of the street and be a minimum of five – six feet wide. In most locations sidewalks should be separated from the roadway with a vegetated buffer.

#### **□ *Intersection Treatments***

Street intersections are perhaps the greatest barrier that pedestrians face in Loudoun County. A lack of pedestrian safety at intersections is a significant deterrent to walking. Appropriate treatments include a wide variety of features, including high visibility crosswalks, wheelchair ramps, curb extensions, median refuges, countdown signals, in-median safety bollards, mid-block crossings, and more. The Design Toolkit provides more detail about the application and design of many of these treatments.



## Recommended Shared Use Facilities

### □ *Shared Use Pathways*

Shared use pathways or trails are an important component of a bicycle and pedestrian transportation system, because they can provide a high quality walking and bicycling experience in an environment that is protected from traffic. Generally, shared-use paths should be a minimum of ten feet wide and paved. Paved trails are the optimum facility for serving the widest range of non-motorized travelers because they accommodate child and basic cyclists, pedestrians, strollers, skaters, joggers, elderly people and people with disabilities. In Loudoun County shared use paths will be used in four distinct settings:

### □ *Hybrid Shared Roadway*

A *hybrid*, shared roadway is a unique treatment that is more commonly used in Europe. It may be appropriate for rural roads in Loudoun County where existing road way cross sections are narrow, road widening to provide increased paved shoulder width is not feasible, traffic speeds need to be controlled, and bicycle and pedestrian safety improvements are warranted. This treatment provides combined bicycle/pedestrian ways on the outside edges of the roadway with striping and a distinctive pavement coloring and requires motorists to share this space with non-motorized road users.

### □ *Overpasses, Bridges, Tunnels and Bicycle/Pedestrian Ferries*

These are shared use facilities that are used to provide access across barriers such as rivers, streams, railroads, freeways interchange ramps and arterial roads. These facilities are used in conjunction with any of the other types of bikeway and walkway facilities. They provide important linkages where safe and direct bicycle and pedestrian access can be better provided with facilities that are separate from the existing roadway system.

## Recommended Traffic Calming Treatments

Transportation professionals define traffic calming as “the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.” Traffic calming treatments, or measures, are intended to modify driver behavior, reduce vehicle speeds and increase safety and access for all street users.

Some of the engineering techniques and treatments for implementing traffic calming measures include the following:

- Vertical changes in the street--speed bumps, speed tables, raised intersections;
- Lateral changes in the street--chicanes, offset intersections, lateral shifts;
- Constrictions in the street--narrowed travel lanes, narrowed pavement widths, pinch points, islands, traffic circles or roundabouts, entrance features, small corner radii;
- Related streetscaping--surface textures, edge treatments, colors, landscaping, street trees and street furniture.

commuters, sheltered transit stops in commercial developments, and wayfinding systems in residential and mixed use communities.

Zoning and/or subdivision development codes should be modified to provide stronger guidance on appropriate site design to encourage pedestrian and bicycle access. The following more specific modifications should be considered:

- internal bicycle and pedestrian circulation systems in the form of on-street bicycle accommodations and sidewalks (per the LOS minimums), and future transit stops as appropriate;
- the provision of off-street bicycle and pedestrian circulation and pathway systems that provide needed connections and *reduce travel distances* for pedestrians and bicyclists;
- necessary improvements to the roadways in the adopted Network within the determined area of impact (per the LOS minimums);
- bicycle, pedestrian and transit access linkages to the adopted Network outside of the development, but within .25 miles of it;
- depending on the size of the development, bicycle and pedestrian access through the development in various directions, so as to prevent it from becoming a barrier between other trip origins and destinations in the community;
- sufficient number of bicycle and pedestrian access points to ensure efficient connections to and from

the various activity nodes within the development and linkages to existing or future adjacent developments.

- appropriate forms of bicycle parking, located in the appropriate places throughout the development, and showers and changing facilities in places of employment (per bike parking policy noted below);
- appropriate wayfinding systems and other amenities to ensure the safety, comfort and security of bicycle and pedestrian travelers;
- meeting or exceeding minimum county bikeway and walkway design standards for all of the accommodations outlined above (even optional facilities provided according to (b) above.

## 5.6 Transit and Ridesharing Policies

Loudoun County has only recently established bus transit services within the County, and ridesharing facilities and programs have been growing as residential and employment based development expands in Eastern Loudoun. Currently, services include six fixed route bus routes in greater Leesburg, the 7 to 7 on 7 between Leesburg and Town Center Plaza on Drainsville Road, and two commuter bus services (Cascades Town Center to W. Falls Church Metrorail Station and service from Purcellville, Hamilton, Leesburg and Dulles N. Transit Center to Washington, DC). Eleven Park and Ride Lots serve carpools, vanpools and the commuter bus routes, and a telework center is located in Sterling.

Even though Loudoun County's transit services are small today, maintaining and developing high quality pedestrian and bicycle access is important for today's success and tomorrow's future. Important considerations include:

- provision of concrete pads and shelters at transit stops and stations,
- curb ramps and other sidewalk improvements around bus stops to ensure accessibility,
- secure and sheltered long-term bike parking at park and ride lots, and
- bicycle access on buses using front-mounted racks.

As a suburban jurisdiction with lower densities and spread out land uses, integrating bicycle and transit services will widen the service or "catchment" area of a bus line or transit center and thus increase the numbers of people who might choose transit for a particular trip.

The W&OD Trail running the length of the County presents new and creative opportunities. There may be potential to develop "drive and ride" trips, where commuters drive their car (with their bike on the back) to a W&OD trailhead, and bicycle to an employment site near the trail in the Dulles area, Fairfax County, Arlington or Alexandria. Given today's lifestyles and traffic congestion on the roads, there may be a significant market of people who are interested in combining regular exercise with commuting, but don't have the luxury of living adjacent to the trail.

The most significant opportunity Loudoun County has to maximize the effectiveness of transit is to ensure high quality bicycle and pedestrian access to the future transit stations that will come with the Dulles Metrorail extension project. Additionally, all future transit planning efforts undertaken by the County, the Washington Metropolitan Area Transit Authority (WMATA), the Northern Virginia Transportation Commission (NVTC), VDOT or others should thoroughly address bicycle and pedestrian access to and integration with transit.

Specific policy recommendations for transit access are provided in Section 5.8.

## **5.7 Network Maintenance and Management Policies**

Because the County does not own or manage any of the roadway system, ensuring good maintenance will require coordination with a variety of other parties. This includes VDOT, NVRPA, developers and property managers, Home Owners Associations (HOAs) and others. VDOT will maintain approved bicycle and pedestrian facilities located within the right-of-way of roadways that are under its operational control, except for snow and ice removal (as per VDOT policy of Dec. 19, 2002). Until the County is able to initiate a larger public works development and maintenance capacity, other facilities will have to be maintained by their respective owners.

A first step in developing a maintenance program is to identify what tasks need to be undertaken and who is responsible for these tasks based on which bikeway and walkway facilities they apply to. Recommended maintenance practices include:

- Sweeping bicycle lanes and shoulders regularly to remove debris;
- Roadway surface and sidewalk repairs to ensure a continuous facility and smooth surface that is free of cracks, potholes, bumps and other physical problems;
- Cutting back vegetation including intrusive tree roots to prevent encroachment;
- Maintenance of bicycle and pedestrian signs, striping, and markings, especially replacement of signs that are damaged by vehicle crashes and other incidents.
- Maintenance of drainage facilities including catch basins and drainage grates;
- Careful repair of utility cuts to prevent rough surfaces for cyclists and sidewalk interruptions for pedestrians;
- Snow removal

The NVRPA has a model maintenance and management program for the W&OD Trail, as well as a long history of working with trail support groups to augment the agency's maintenance resources with those of volunteers. Practices and procedures from this model should be studied and applied to existing paths in the County and new pathway

facilities that may be added to the network by VDOT or developers.

Specific policy recommendations for network maintenance are provided in Section 5.8 and in Appendix E.

## 5.8 Recommended Actions

The following actions will be necessary in order to implement the policies identified above.

**Action 5a: Adopt the policies set forward in this Plan, as necessary through amendments to zoning and subdivision revisions, and amendments to the Facilities Standards Manual.**

**Action 5b: Utilize accepted national standards and guidelines for the design of bicycle and pedestrian facilities, including the AASHTO Guide for the Development of Bicycle Facilities, the Americans with Disabilities Act Accessibility Guidelines, and Design Toolkit developed for this Plan.**

**Action 5c: Use emerging design techniques for bicycle and pedestrian facilities on a trial or demonstration basis.**

**Action 5d: In conjunction with VDOT, develop a planning and design policy for**

accommodating bicyclists and pedestrians through highway interchanges (see also Actions 12-14).

network. Once a system is established, a Maintenance Action Request Form would give citizens an easy means of reporting maintenance concerns.

**Action 5e:** Review traffic calming and traffic management strategies that may be appropriate for different classes of roadways. Establish a dialogue with VDOT to identify acceptable design methods of discouraging speeding on urban arterials, collectors, residential streets and rural roadways. Develop detailed guidelines and initiate incorporation of guidelines into the Loudoun County Facilities Standards Manual.

**Action 5f:** Encourage the Board of Education to review and provide advisory consent for the Level of Service policy elements that relate to schools and the creation of safe bike and walk routes around new and existing schools.

**Action 5g:** Adopt county policy to ensure that all ongoing and future transit planning efforts fully address bicycle and pedestrian access to and integration with transit systems.

**Action 5h:** Establish a lead agency and system to address both regular and remedial inspection and maintenance of the on-road and off-road bicycle and pedestrian

# Chapter 6: Recommended Bicycle and Pedestrian Network

## 6.1 Network Overview

Identifying a network of existing and proposed bikeways and walkways is a central element of this Plan. It is the first step toward achieving the goal of countywide bicycle and pedestrian connectivity among residential neighborhoods, Towns, villages, workplaces, shopping centers, transit stations, schools, parks and other important destinations.

The Bicycle and Pedestrian Network Map (see page X) shows the primary routes and locations that should be improved. Elements shown on this map include the following:

- Roads and streets proposed for bicycle and pedestrian accommodation
- Proposed neighborhood linkages
  - Short path connectors
  - Bridges
  - Bicycle & pedestrian ferries
- Proposed off-road, shared use path corridors
- Pedestrian hot spots
- Key linkages to neighboring jurisdictions

The purpose of the Network map is to establish a vision of what should be provided over the next 15-20 years to

create an attractive and functional network. It provides a geographically comprehensive framework that addresses the County's primary bicycle and pedestrian connectivity needs. The map is not intended to suggest that bicycle and pedestrian improvements are not necessary in locations that are not designated on the map. Nor is it intended to show where specific types of improvements or facilities addressed in this plan are to be located.

## 6.2 Analysis Process

To select the facilities and features in the proposed Network, a variety of exercises were undertaken and many inputs were considered. First, ideas for bicycle and pedestrian improvements and desired locations for access were gathered from CAC members at working sessions of the committee and the general public at four evening meetings and via the project website. Additionally, field visits were conducted by the CAC and the project staff. Input was also received from members of the Interdepartmental Advisory Team (IDAT), which is composed of County agency staff.

Roadway and intersection designations in the Countywide Transportation Plan (CTP) were studied and mapped, and CTP roadway design policy and functional classifications were also reviewed. This was augmented by a thorough study of road and street connectivity, identification of planned future roads, a review of existing and planned population density, and identification of key destinations

such as parks, schools, employment centers, shopping centers, etc.

In addition to review and mapping of the County's Policy Areas – Suburban, Transition, Rural and Joint Land Management, a number of planning documents were reviewed, including:

- Town bicycle, pedestrian and vehicular circulation plans and trail and greenway plans;
- County, VDOT, Route 28 Improvement District and other roadway improvement plans and programs; and
- studies identifying existing and proposed transit routes.

Finally, the bicycle and pedestrian Level of Service results described in Chapter 4, and the bicycle and pedestrian Latent Demand Analysis conducted as a part of the **Northern Virginia Regional Bikeways and Trails Study**, were factored into the analysis.

#### Pedestrian Hot Spots

A special methodology was used for selecting pedestrian *Hot Spots*, which are represented on the map with red circles. Pedestrian *Hot Spots* include both high use areas and problem areas--some *Hot Spots* are both (for more details about the inputs used to select *hot spot* locations see Appendix X).

- *High Use* areas are locations where significant levels of pedestrian traffic are already present or where

higher levels of use are desired or likely due to latent demand analysis or future land uses and projected development.

- *Problem Areas* are locations where pedestrian crashes are occurring, where street crossings are difficult or dangerous, where connectivity is desired but blocked by large roads, lack of facilities or other barriers, or where poor pedestrian conditions or personal security are a deterrent to pedestrian use.

### 6.3 Network Development Priorities

The connectivity goal identified in this Plan calls for increased bicycle and pedestrian access among a diverse set of activity nodes. Additionally, improved access to the W&OD Trail, the C&O Canal Towpath in Maryland and the scenic Western Loudoun countryside are also important connectivity objectives.

As described in Chapter 3, the primary barriers to increased connectivity are poor levels of service on existing roads and bridges, gaps in the existing bicycle and pedestrian network, large road intersections that are intimidating to bicyclists and pedestrians, multi-lane roads that are difficult to cross, and large features such as Dulles Airport and the Potomac River. The following set of recommendations address these issues and provide a detailed guide for future actions that will improve bicycle and pedestrian connectivity over the next 15-20 years. They have been organized into seven groups:

- Major Road and Connecting Corridors
- Off-Road Path Corridors
- Neighborhood Connectors
- Rural Bicycle Touring Routes
- Pedestrian Hot Spots
- Traffic Calming Locations
- Connections to Neighboring Jurisdictions

### Major Roads & Connecting Corridors

The list of corridors in Table 3 was developed to identify the major linkages that are needed to connect key destinations, population centers, and activity nodes throughout the county. The primary criteria used to select these corridors included public input, roadway network analysis, latent demand analysis, and an assessment of origins and destinations.

**Table 3: MAJOR ROADS AND CONNECTING CORRIDORS**

| # | Corridor Name                             | Primary Roads/Facilities Used   | Rationale & Areas Linked  | Key Issues & Needs  |
|---|---|---|---|---|
| 1 | Lowe's Island -- Cascades Town Ctr. (CTC) | Neighborhood Streets such as Lowe's Is. Blvd., Westwood, Sugarland Run Dr. and Cottage Rd., and New Connector Trails. | Link residential areas to shopping/employment/transit.  | Improve tunnel at Great Falls Shopping Ctr. & provide over Sugarland Run and connections through neighborhood streets.  |
| 2 | Dulles Town Ctr. - -Cascades T.C.         | New Connector Trails & Bridge over Rte. 7   | Link mixed use areas and provide safer crossing of Rte 7.   | Potential new bridge over Rte. 7 just west of Cascades interchange.   |
| 3 | N.V. Police Academy – Cascades T.C.       | New Connector Trails, Winding Rd., Rte. 7 corridor.   | Link multiple residential areas to shopping/employment/transit.   | Bridge over Broad Run, sidepath along Rte. 7.   |
| 4 | Cascades T.C. – Sterling & Herndon        | New Connector Trails, Amelia St., Church, Lincoln, & Crestview; spur on Church Rd. east and west of Sterling Blvd.    | Link Sterling neighborhoods to CTC; link Cascades nbhds. to W&OD & Herndon destinations.  | Potential for partial grade separated crossing of Rte. 7 at Potomac View.   |
| 5 | Route 7 East (See Corridors 2-4 above)    | Route 7: Fairfax Co. Pkwy. to Route 28.   | Improve access along 7 from Fairfax Co. Pkwy to Route 28.   | Can be planned and implemented in discrete segments; sidepath layout and alignment will need to vary; more needed on both sides in all segments.  |
| 6 | Riverside Pkwy. /Route 7                  | Route 7, Riverside Pkwy or both from River Creek Pkwy to Rte. 28/Broad Run; New Connector Trails and Bridge.          | Link Leesburg with Cascades; the W&OD Trail is too far south. Links in Landsdowne, L. Hospital Ctr. and educational institutions N.of Rte.7 | Determine if facilities are provided on Riverside Pkwy; also be needed on all of Rte. 7. Proposed new interchange along Rte 7 will be a design challenge. Use same bridge over Broad Run as Corridor 3. |
| 7 | W&OD Trail – Algonkian Reg.               | Church, Cascades Pkwy, New Connector Trails   | Link major recreational destinations and activity areas between.  | Use same new bridge over Rte 7 as Corridor 2; improve road conditions.  |

|    |                                    |   |   |   |
|----|------------------------------------|---|---|---|
|    | Pk.                                |   |   |   |
| 8  | Algonkian Pkwy                     | Algonkian Pkwy, Holly Knoll Dr.   | Link resources along Algonkian; residential areas, parks, schools, Fairfax Co. trail system, Dulles T.C.                                | Coordinate with Fairfax County, developers who n and HOAs.  |
| 9  | Lovettsville - New Brunswick, MD   | VA 287, Berlin Turnpike   | Link Lovettsville w/ C&O Canal and N.B., MD MARC train stn.   | ROW acquisition may be necessary; abandoned n present opportunity for sidepath.   |
| 10 | Purcellville - Lovettsville        | VA 287, Berlin Turnpike   | Link Purcellville and W&OD Trail to Lovettsville & C&O Canal Towpath.   | ROW acquisition may be necessary; selecting a b facility type may require a study.  |
| 11 | Round Hill - Hamilton              | Business Route 7  | Link Towns via their Main Streets: Round Hill, Purcellville & Hamilton. Improves access to Franklin Park, W&OD Trail and local schools. | Bikeway/walkway facility design will need to vary t this long and diverse corridor. Intersection design modal traffic flow are key.                 |
| 12 | W. Virginia - Round Hill           | Route 7   | Link W&OD Trail and Round Hill w/ Bluemont & Appalachian Trail  | ROW acquisition may be necessary; selecting a b facility type may require a study.  |
| 13 | Clarke's Gap Road                  | VA 662  | Link W&OD Trail with Waterford and surroundings.  | ROW is narrow and corridor has constraints prese historic/environmental characteristics. Good locati innovative treatment.                          |
| 14 | White's Ferry Access               | King St. from Market St., US 15, White's Ferry Rd.; spur on US 15 bypass from Ft. Evans Rd. to the merge with 15.                                 | Link Leesburg with White's Ferry & C&O Canal. Provide access to Ida Lee and Balls Bluff parks.  | Proper facility design on high speed, high volume roadways.   |
| 15 | White's Ferry - Point of Rocks, MD | US 15   | Link Leesburg Town Center, Lucketts and Point of Rocks MARC station. Provide access to Temple Hall Farm Reg. Park.                      | Road widening may be necessary. Managing traff intersection design, safety and potential historic a resource impacts are key.                       |
| 16 | King Street South                  | King St. from Market St. to Harmony Ch. Rd; spur on Evergreen Mill from King St. to Heritage High School; spur on Masons Lane & Battlefield Pkwy. | Link Leesburg Town Center, W&OD Trail S. Leesburg neighborhoods and three new schools and a park.                                       | Facility design through Interchange at Rte. 7 Bypa  |
| 17 | Market St. / Fort Evans Road       | Market St (& Loudoun) from western Town Line to Fort Evans Road to River Parkway  | Link Leesburg Town Center with Fort Evans Plaza shopping area and Corridor 6 at Founders' Field.  | See NOVA Bikeway Study Case Study for issues St.; reconnecting Ft. Evans Rd. at Rte 7 Bypass in and crossing intersection, is key for bike & pedest |
| 18 | Edwards Ferry Rd.                  | Edwards Ferry Rd. from Market to Shoal Creek  | Link Leesburg Town Center with Red Rock Reg. Park and River Creek community.  | Intersection crossing improvements at Rte. 7 bypa   |
| 19 | Sycolin/Plaza                      | Plaza St. in Leesburg and Sycolin Rd. to Belmont R. Rd.   | Links northern Leesburg, W&OD Trail, new neighborhoods in southern Leesburg, Leesburg airport, and mid-Ashburn.                         | Improved access is needed at W&OD Trail crossin Leesburg; plans to develop interchange at Sycolin Rte. 7 Bypass will present design issues.         |
| 20 | Farmwell/Waxpool East              | Ashburn Farm Pkwy from Belmont R.Rd. to Farmwell Rd. to Waxpool Rd.   | Link middle Ashburn with Dulles employment area, W&OD Trail and   | Integrating bicycle/pedestrian improvements into v improvement projects; design of accommodations   |

|    |                                  |  |   |  |
|----|----------------------------------|--|---|--|
|    |                                  | to W&OD Trail  | Sterling/Cascades   | interchange at Route 28.   |
| 21 | Waxpool West                     | Waxpool Rd. from Belmont Ridge to WorldCom Campus; spur on Broadlands Blvd./ Shellhorn Rd./Faulkner Pkwy. to Waxpool.  | Link southern Ashburn with Dulles employment area, W&OD Trail and Sterling/Cascades. Provide linkages to local schools in Ashburn.  | Integrating bicycle/pedestrian improvements into improvement projects; improving local linkages with various campuses of the Dulles Employment Area  |
| 22 | Gloucester Pkwy./Hay Rd.         | Uses Gloucester Pkwy from Belmont R. Rd. to Nokes Blvd. to Dulles TC and Cascades Parkway; spur on Hay Rd. to W&OD Trail to Farmwell MS; and spur on City Center Blvd. to Rte. 7 | Link northern Ashburn with Dulles employment area, Dulles Town Center and Sterling/Cascades. Provide linkages to local schools in Ashburn.  | Integrating bicycle/pedestrian improvements into improvement projects; design of accommodations interchange at Route 28.   |
| 23 | Loudoun Co. Pkwy.                | Presidential Dr. from GWU-VA Campus & Loudoun County Parkway to S. Riding and Manassas Battlefield in Prince William Co.   | Link Potomac Heritage Natl. Scenic Trail (PHNST) & Rte. 7 with Dulles Employment Area, S. Riding and P.W. County.   | Facility design; and ensuring utility of bicycle and features as the Parkway is implemented in phases spread over a significant time period.   |
| 24 | Ashburn Road                     | Landsdowne Blvd., Ashburn Rd. Shellhorn Rd., Ryan Rd.and short off-road trail connector.   | Link Landsdowne, Ashburn Village, W&OD Trail and future Moorfield Metrorail station. Provide linkages to local schools in Ashburn.  | Integrating bicycle and pedestrian facilities into the narrow ROW and through Ashburn Village. Complete linkage to the future rail station near Ryan Rd./26 interchange.   |
| 25 | Ashburn Village Blvd. / Ryan Rd. | Janelia Farm Blvd., Ashburn Village Blvd. Ryan Square Rd., Ryan Rd. (or East-West Connector), to Evergreen Mill Rd.  | Link Rte. 7, central Ashburn, future Moorefield Metrorail station, Belmont Green, and Brambleton Reg. Park. Provide linkages to local schools in Ashburn and western parts of the Dulles Employment Area. | Retrofit of recently built Ashburn Village Blvd. and Rd.   |
| 26 | Belmont Ridge Rd.                | Upper Belmont Pl., Xerox Dr., Belmont Ridge Rd. and Gum Spring Rd.   | Links PHNST, Xerox/Landsdowne with W&OD Trail, eastern Ashburn, Brambleton Reg. Park, S. Riding and P.W. County.  | Facility design; and ensuring utility of bicycle and features as road widening is implemented in phases be spread over a significant time period.  |
| 27 | Old Ox Road                      | LC Pkwy & Old Ox Rd. from US 50 to Herndon; spurs on Moran Rd. and Cedar Green Rd.   | Links S. Riding w/ Dulles Employment Center, future 606 Metrorail station, Dulles Airport, W&OD Trail, Cascades & Sterling. Will be a major component of a circumferential route around Dulles airport.   | Facility design; and ensuring utility of bicycle and features as road widening is implemented in phases be spread over a significant time period.  |
| 28 | Atlantic/Shaw                    | Existing and future Atlantic Blvd., Shaw Rd., a short connector trail, Innovation Ave., and Rock Hill Rd.  | Links Algonkian Pkwy, Rte. 7 and Dulles TC with W&OD Trail, Dulles Employment Area, a future Metrorail station and Herndon in Fairfax County  | Alignment of future Atlantic Blvd.; connections with Trail; facility design in high speed, commercial corridors ensuring utility of bicycle and pedestrian features are implemented in phases; ensuring good linkage County near Dulles Toll Road. |

|    |               |                                      |   |  |
|----|---------------|--------------------------------------|---|--|
| 29 | U.S. 50 East  | US 50 from Fairfax County to US 15.  | Links S. Riding to Western Loudoun and Fairfax County | Providing safe and attractive bicycle/pedestrian accommodations on this high speed, high volume road by designing these facilities through multiple proposed interchanges. |
| 30 | U. S. 50 West | US 50 from US 15 to Fauquier County. | Links S. Riding and Middleburg and Fauquier County    | Providing improved bicycle accommodations in conjunction with planned pedestrian-oriented traffic calming measures.  |

### **Off-Road Path Corridors**

Over the course of this study seven possible new trail corridors were identified through public input and analysis of future land development patterns; each are represented on the Network Map (see Table 4).

Five of the seven are directly related to the plans for extending the Metrorail system to Loudoun County along the Dulles Access Road and Greenway. The rationale for development of these trails is directly tied to a strategy of maximizing bicycle/pedestrian access to the Dulles rail extension transit stations, improving bicycle and pedestrian access to the thousands of job sites at and around Dulles Airport, and realizing cost savings by building trail and transit infrastructure at the same time. Following is a brief description of each corridor and the linkage it would provide.

**Table 4: OFF-ROAD PATH CORRIDORS**

| <b>#</b> | <b>Trail Corridor</b>                                | <b>Linkage</b>   | <b>Purpose</b>  | <b>Opportunity</b>  |
|----------|--|--|---|---|
| 1        | Lovettsville / Rte. 287                              | Town of Lovettsville to New Brunswick Bridge   | Provide high quality facility in this high use corridor serving recreational trips, river access and commuters to the MARC rail station in New Brunswick        | An abandoned road may present an opportunity to create a shared use path in this corridor.              |
| 2        | Bluemont Connector                                   | Round Hill to Bluemont   | Further extend the W&OD Trail, link Round Hill and Purcellville with the Appalachian Trail near Bluemont.   | Other than Route 7, assembling easements appear to be the only opportunity to create a public corridor. |
| 3        | Moorefield Station – Greenway West                   | Rte 772 Metrorail Station to Belmont Ridge Rd.                                       | Link Brambleton Regional Park, schools and new residential development to transit.  | Receive proffers from developers; use new road corridor as stream corridor.                             |
| 4        | Moorefield Station – Greenway North (Beaver Dam Run) | Rte 772 Metrorail Station to W&OD Trail in Ashburn Village following Beaver Dam Run. | Link Ashburn residential communities to transit. Link W&OD Trail, Ashburn Park, Greg Crittenden Park and local schools. Provide off-road alternative to Ashburn | Receive proffers from developers; use new road corridor as stream corridor.                             |

|   |   |   |   |  |
|---|---|---|---|--|
|   |   |   | Road.   |  |
| 5 | Moorefield Station – Greenway Northeast | Rte 772 Metrorail Station to Route 7  | Link new transit station to Ashburn neighborhoods, W&OD Trail, employment areas around WorldCom campus, and new development west of Broad Run.  | Receive proffers from developers; use stream cor   |
| 6 | Dulles Airport Ring Route               | Rte 606 Metrorail Station to US 50 to new Air & Space Museum to Sully Rd. Metrorail Station | Link South Riding with NE Loudoun County and western Fairfax Co.  | Include route as a part of roadway upgrades to RT 28 and the Rte 50 N. Connector.              |
| 7 | Dulles Rail Extension Trail             | Sully Rd. Metrorail Station to Rte. 772 Metrorail Station.                                  | Complete the loop around the airport, link the loop to the airport terminal, provide access to employment sites in Rte. 28/Dulles business center, link the airport loop to Ashburn and Herndon | Include in Loudoun County request to WMATA and Northern Virginia Transportation Commission (NV |

### **Neighborhood Connectors**

On the Network Map neighborhood connectors are shown using two symbols: purple lines and purple triangles. Many of these proposed connector facilities are components of the major corridors already discussed, others will be discussed as a part of a later section addressing W&OD trail crossings and access. Within Ashburn, Cascades and Sterling there are additional locations for small connector paths that would provide more efficient local connections. These include the following:

- ❑ upgrading the connection across Claude Moore Park;
- ❑ connecting some of the isolated subdivisions of Countryside;
- ❑ upgrading and extending connectors around Ashburn Park, and better connecting central Ashburn neighborhoods with the W&OD Trail (see also Corridor 4 above);

- ❑ providing linkages across the open space at Northern Virginia Community College Campus linking Cottage, Potomac View and Campus Drive to Cascades Town Center.
- ❑ improving neighborhood connections to the Sugarland Crossing Shopping Center area on the south side of Route 7;
- ❑ linking the W&OD Trail to Severn Way West across Broad Run;

### **Rural Bicycle Touring Routes**

Western Loudoun remains very popular as a recreational bicycle touring area. Its scenic farm country and historic towns and villages are popular destinations for bicyclists from around the region. Some long distance touring routes use Western Loudoun’s roads as well. Both the W&OD Trail and C&O Canal Towpath connect the heart of the Washington region with rural Loudoun, bringing long distance cyclists, racers on training runs, club rides and even families. Moreover, many Loudoun County residents

love to bicycle in the area. Unfortunately, increases in development in Loudoun and in West Virginia and Fredrick County, Maryland has increased traffic volumes and speeds on Loudoun’s rural roads and through highways. The Bicycle Level of Service analysis performed for this plan found that most rural roads in Western Loudoun had levels of service “D” or lower.

An opportunity exists to initiate a network of designated bicycle touring routes in Western Loudoun. Designated routes can be signed, mapped, and promoted by local business and economic development entities. In addition to the economic benefits that can be realized by designating routes, it can also create an impetus for Towns, villages and private sector entities on the route to provide amenities that support recreational bicycling. These amenities might include rest stops, information kiosks and bike parking in towns, as well as new business development such as bed and breakfasts, bike shops, restaurants, and tour guide services.

Given current Bicycle Levels of Service, this Plan identifies two potential routes for field study and designation:

- Waterford to Tarara Vineyard & Winery (VA Rte. 662)
- Purcellville to Middleburg to Round Hill (VA Rtes. 772, 728, 622, 630, 734, 748, 50, 626, 719)

**Pedestrian Improvement Areas (“Hot Spots”)**

Pedestrian improvement areas include both high use areas and problem areas – some pedestrian hot spots are both.

The Network Map identifies 66 hot spots, representing a wide variety of situations. For the purposes of discussing hot spots in the Plan, they have been organized into the following classes. For a complete list of hot spots see Appendix X.

| <u>Class</u> | <u>Hot Spot Type</u>  | <u>Number of Hot Spots</u> |
|--------------|---|----------------------------|
| 1            | Town Centers, Village Centers, Shopping/Employment Areas, School Areas, Future Rail Transit Centers | 29                         |
| 2            | Intersections   | 7                          |
| 3            | Planned/Existing Interchanges   | 22                         |
| 4            | W&OD Trail/Road Intersections, Road Segments, Potomac River Bridges                                 | 8                          |

**Class 1: Activity Centers**

Typical pedestrian issues in Class 1 hot spots include ADA accessibility, crosswalks and intersection safety, wayfinding needs, gaps in the sidewalk network, a need for bus stop improvements or parking and personal security concerns. Additionally, bicycle parking in the form of racks or lockers is usually a need as well. Town Centers typically have the most complex and diverse set of needs. Communities like Leesburg and Middleburg are based on traditional town plans with Main Street shopping districts and sidewalks, however traffic calming, mid-block crossings, intersections improvements and ADA accessibility are often key needs. The newer Cascades

Town Center has fewer ADA accessibility issues, but there is a need to address the large and high speed roads and intersections that surround it, improve neighborhood linkages with connector paths, provide bike parking and add wayfinding signs. Needs in Village Centers and school areas tend to be smaller in scope and center around adding sidewalks or eliminating gaps in the sidewalk system, improving key crossing points, and utilizing gateway treatments as a part of traffic calming measures.

The Cascades Town Center Case Study included in this Plan provides an example of a more detailed town center study with ideas for improving intersections and walkability.

## **Class 2: Intersections**

Seven intersection hot spots are identified on the Network Map, highlighting pedestrian crossing problems at a total of nine specific intersections (see table below). Many of these intersections were identified by more than one person during the public outreach and comment process.

It should be noted that other problem intersections are identified in the plan as a part of Class 1 hot spots. Those include intersections along Algonkian Parkway, Main Street in Purcellville, throughout Ashburn, within South Riding along US 50 and the Loudoun County Parkway, in Hillsboro, at Lucketts and White's Ferry Road on US 15

and along various roads that serve the Dulles/Route 28 employment area.

Public comment in this planning process clearly identified great difficulty for pedestrians and cyclists to cross Loudoun County's major roads including Route 7, Business 7, Route 50, Route 15, Route 9 and the Bypasses around Leesburg. Despite the difficulty, there remains a high public desire to make these crossings.

### **Key Problem and High Use Intersections**

Route 9 & Clarke's Gap Road  
Route 15 Bypass & Edwards Ferry Road  
Route 15 Bypass & Fort Evans Road  
Route 7 & Campus Drive (NOVA Com. College)  
Route 7 & Potomac View Road  
Route 7 & Palisades Parkway  
Route 7 & Countryside Blvd.  
Palisades Parkway & Southbank Street  
Palisades Parkway & Potomac View Road

Implementing intersection improvements designed to increase both perceived and actual safety should be a central element of Loudoun County's future bicycle and pedestrian program. The application of specific treatments and designs must be evaluated on a case-by-case basis. New minimum intersection design standards are described in the Design Toolkit. Additionally, the following types of improvements should be considered for improvements to hot spot intersections identified in this Plan:

- ❑ high visibility crosswalks and textured pavement treatments
- ❑ smaller curb radii and curb extensions
- ❑ tactile warning devices and audible pedestrian signals
- ❑ countdown pedestrian signals
- ❑ in-median pedestrian safety bollards
- ❑ median refuge islands and median noses
- ❑ appropriate landscaping

All four Case Studies included in this Plan provide more detailed examples of what is possible with regard to intersection improvements and retrofits.

### **Class 3: Interchanges**

The Loudoun County Countywide Transportation Plan (CTP) identifies 28 locations for major highway interchanges. Interchanges are roadway crossings where some or all of the turning movements are removed from signalized control and facilitated by continuous flow ramps and merge lanes. Future interchange locations are located primarily on VA Routes 7 and 28, and US Route 50, also along the Route 7 and 15 Bypasses around Leesburg.

Typical highway interchanges create significant bicycle and pedestrian safety hazards. Historically, interchange design has not accommodated bicyclists or pedestrians, such as the Route 7 / US 15 Bypass interchange on the east side of Leesburg. This interchange has effectively severed bicycle and pedestrian access between the Town of

Leesburg and the shopping centers between Route 7 and Edwards Ferry Road. Yet close proximity, and the lack of access to a car, has resulted in shoppers and shopping center employees continuing to cross high speed roads and ramps because it is their most reasonable or only alternative.

**Future Route 7, 50 and Bypass Interchanges:** With increased development projected along Routes 7, 50 and the Leesburg Bypasses, it is critical that future interchanges on these roads include bicycle and pedestrian crossing accommodations. Moreover, new designs for these interchanges should be explored which are easier and less costly to make safe for non-motorized travelers. It may be the case that the need for an interchange should be reconsidered in light of the need for the roads using it to carry significant amounts of bicycle and pedestrian traffic. The funds saved from not constructing two or three planned interchanges could be used to provide bicycle and pedestrian accommodations through other interchanges or used to design highly efficient and safe at-grade intersections.

**Route 28 Interchanges:** A number of interchanges along Route 28 are already in design. Because Route 28 is being upgraded to a limited access highway, interchange ramps are the only way to accommodate access and crossing roads. However, because of its strategic location between Ashburn and Sterling, Route 28 has the potential to become a major barrier to bicycle and pedestrian travel between two of the largest

communities in Eastern Loudoun. Currently, the W&OD Trail is the only bicycle and pedestrian access across Route 28, and its SE/NW alignment limits its ability to serve many future bicycle and pedestrian trips that need to cross Route 28.

### **Class 4: W&OD Trail Crossings and Access Needs**

Three at-grade road crossings of the W&OD Trail are identified in the Plan as *hot spots* in need of crossing safety improvements: Belmont Ridge Road, Ashburn Road and Sterling Blvd. Additionally, nine locations for access improvements are indicated on the Network Map as Neighborhood Linkages (purple triangles).

**Trail crossing safety improvements:** Current Northern Virginia Regional Park Authority (NRVPA) policy requires that all new roads and road widening projects must provide overpasses or underpasses for the Trail. NRVPA underpass standards prohibit tunnels and include high quality guidelines to ensure safe and secure underpass facilities, or modestly-sloped bridge overpasses.

Current CTP roadway plans will result in future grade separations at Belmont Ridge Road, Claiborne Parkway (under design), Smith Switch Road, Pacific Blvd., Atlantic Blvd., and Church Road (under design).

However, for trail/road intersections that are likely to remain at-grade for many years, crossing safety improvements should be implemented. The following types of treatments should be considered: upgraded warning signs, use of high visibility crosswalks, use of median refuges, painted rumble strips for the roads, trail bollard or chicane designs that require slower bicycle/skater crossings and allow bicycle stops without dismounting, lighting, and/or electronic trail sensors tied to motorist warning lights.

**Trail access improvements:** Maintaining bicycle and pedestrian access from bikeways and walkways along the crossing road is not a part of the current NVRPA requirements and is frequently reduced or lost with grade separation projects. In Loudoun County an example of this is where Loudoun County Parkway crosses the Trail. Moreover, grade separation design does not always favor trail users. Frequently roadway design requirements dictate that the trail be taken up and over the road, requiring the trail users (who travel without motorized power) to raise their elevation, rather than road users.

Locations where new or improved access to the trail is proposed in this Plan are listed below. In some cases connector trails are needed, in others ramps from the crossing road. Some locations might be appropriate for increased trailhead parking.

| <u>Community</u> | <u>Location</u> | <u>Need</u> |
|------------------|-----------------|-------------|
|------------------|-----------------|-------------|

|                              |  |  |
|------------------------------|--|--|
| Eastern Leesburg             | Chancellor St.                             | Connector trail  |
| Western Leesburg             | Plaza St.                                  | Connector trail and ramps  |
| Western Leesburg             | Kincaid Forest Neighborhood                | Connector trail at a more convenient location.                             |
| Ashburn                      | Belmont Green Park & Forest Farm Lane      | Connector trail  |
| Ashburn                      | Between Claiborne Parkway and Ashburn Road | Connector trails from neighborhoods on north and south sides of the trail. |
| Ashburn                      | Ashburn Village Blvd.                      | Improved connector trails, ramps and signs.                                |
| Dulles/Rte 28 Business Dist. | Loudoun County Parkway                     | Ramps and connector trail west across Broad Run.                           |
| Dulles/Rte 28 Business Dist. | Pacific Blvd.                              | Ramps  |
| Dulles/Rte 28 Business Dist. | Atlantic Blvd.                             | Ramps  |

#### **Class 4: Traffic Calming**

In the Revised Countywide Transportation Plan, the County has already adopted policy to “promote and implement traffic calming measures in all policy areas.” Moreover the County will “seek to expand traffic calming through community based programs in the Suburban, Transition, Rural Policy Areas and Towns through the proposed Community Plan process, new development applications, and through collaboration with VDOT on rural collector and arterial roads.”

Traffic calming is one means of improving bicycle and pedestrian safety and access within hot spots. This Plan identifies the following hot spots where traffic calming measures are needed:

- ❑ Planting Field Road in South Riding
- ❑ White’s Ferry Road
- ❑ Business Route 7 from Hamilton to Round Hill.  
This roadway serves as Main Street for Hamilton, Purcellville and Round Hill. The County, in coordination with these Towns, is developing an integrated economic development, planning and historic preservation effort based on the “Main Street” model to support towns’ and county goal that the towns serve as functional, multi-modal centers in the Rural Policy Area. A traffic calming project similar to the Route 50 effort would be a strong complement to this ongoing effort.

- ❑ Route 9 through Town of Hillsboro. Route 9, from the West Virginia line to Route 7, is a fast, 2-lane road that is also the Main Street of Hillsborough. It is county policy not to increase the capacity of Route 9 to serve long distance commuters, which is consistent with efforts to make Hillsborough somewhat more negotiable by foot or bike. Traffic calming the length of the Town, if deemed beneficial by Town leadership, should be considered.
- ❑ Route 15 through Lucketts
- ❑ Route 287 through Lovettsville
- ❑ Intersection of Routes 662 and 9

## Connections to Neighboring Jurisdictions

Making connections to neighboring jurisdictions is especially important to bicyclists in Loudoun County, but also pedestrians. These connections are most important on the eastern and southern boundaries with Fairfax and Prince William Counties. Access across the Potomac River to the C&O Canal Towpath, Montgomery and Fredrick Counties in Maryland is also important, for recreational access and linkage to commuter rail services into Washington, D.C. Two key connections emerged related to West Virginia and the Appalachian Trail--at Route 7 and US 340. Purple stars on the Network Map indicate key inter-jurisdictional linkages.

The Network Map highlights the three Potomac River bridges as facilities that should provide improved bicycle

and pedestrian accommodations when they are upgraded or rebuilt. These bridges are owned and operated by the Maryland Department of Transportation. The Plan also proposes consideration of new “bicycle and pedestrian only” ferry services at two locations: the old Edwards Ferry Crossing and Algonkian Regional Park. These could be public or private operations and be started as only limited seasonal and/or weekend services. They would augment the current White’s Ferry service and enable recreational loops to be made using the C&O Canal Towpath.

## 6.4 Summary of Case Studies

Appendix G includes four case studies that illustrate the types bicycle and pedestrian improvements that can be made in typical situations within the county.

- ❑ The Cascades Town Center study shows how intersections can be made more pedestrian friendly and how large collector roads can have bike lanes added within the existing right-of-way. This study also shows how use of connector trails, bike parking, and pedestrian access at the periphery, neo-traditional suburban retail development can be made more accessible to the residential communities surrounding them.
- ❑ The Clarke’s Gap study addresses rural road and intersection design, traffic calming on arterial roads and accommodations for bicycle’s and pedestrians in the highway environment. This difficult

intersection is very near the W&OD Trail and is a major connecting point for cyclists and runners heading to and coming from the attractive country roads around Waterford.

- The Maple Avenue study in Purcellville looks at gaps in the sidewalk network and at intersections can make life safer for pedestrians, especially young people going to and from a local high school. This study shows defining the road edge and travel lanes, with curbs, driveways, designated bike lanes and mid-block crossings can bring order to the traffic chaos that is increasingly impinging on Loudoun's small towns.
- The Farmwell Station Middle School study in Ashburn looks at basic school access and safety issues. Because this school is adjacent to the W&OD Trail it will also examine trail security and how a major trail corridor can serve student bicycle and walking trips.

## 6.5 Recommended Actions

Implementing development of the Network will require a sustained effort over a period of many years. Following are key actions that are recommended for implementation over the next 5-7 years.

**Action 6a: Adopt the proposed Countywide Bicycle and Pedestrian Network map.**

**Action 6b: Ensure that every opportunity is used to improve bicycle and pedestrian conditions along the Major Road and Connecting Corridors. Because of their complexity and large scope these routes will be developed on a segment-by segment basis.**

**Action 6c: Initiate feasibility studies for Off-Road Path Corridors 1-6.**

**Action 6d: Request that the Dulles Rail Extension Trail (Path Corridor 7) be included in the planning, design and funding activities currently underway for the rail extension project.**

**Action 6e: Seek funding for planning, design and construction of one Neighborhood Connector project per year over the next six years.**

**Action 6f: Conduct a field study of two Rural Bicycle Touring routes, develop a designation plan and signage design, and implement designation.**

**Action 6g: Provide planning leadership for pedestrian improvement areas in unincorporated areas. Each hot spot should receive a walking audit and field assessment of needs. Improvement projects should be initiated based upon opportunities that**

arise such as new developments, road improvements, or construction of public facilities.

**Action 6h:** Adopt policies and take actions to ensure the development of connector trails, interchange access, access to adjacent jurisdictions and improved access to the W&OD Trail as identified above.

**Action 6i:** As described in this chapter, implement traffic calming treatments as a component of routine roadway improvement projects, intersection retrofits or other bicycle or pedestrian projects.

**Action 6j:** Encourage the Board of Education to initiate a “Safe Routes to School” Pilot Program, based on existing models used in California, Maryland and elsewhere to plan and implement improvements and safety campaigns at one or two schools designed to increase the number of children and youth who can safely bicycle or walk to school.

# Chapter 7: Recommended Education and Safety Programs

## 7.1 Educating the Public and Community Leaders

Educating the public and community leaders about the values and benefits of improving conditions for walking and bicycling is important for at least two reasons. First, for this plan to succeed it needs to have broad support from the general public, the business community, and elected officials who set policy and approve budgets, not only in Loudoun County, but in Richmond and Washington, DC. Secondly, education of the general public is key to supporting the promotional efforts identified in the Plan. Increasing the numbers of people to choose bicycling and walking, and choose them more often, requires information exchange and education about the opportunities and benefits. For these reasons the Plan recommends a number of actions to ensure that this education process gets started.

## 7.2 Promoting Increased Bicycle and Pedestrian Activity

The National Capital Region Transportation Planning Board maintains a strong interest in local jurisdiction

involvement in various types of promotional programs that are designed to reduce single occupant vehicle trips. They range from promoting carpools and vanpools and providing park and ride lots to promoting bike-to-work day, and telecommuting. Loudoun County is already involved in annual bike-to-work day activities, however additional promotional opportunities can be undertaken to expand the numbers of people bicycling and walking for utilitarian transportation. More bicycle and pedestrian trips will translate directly in terms of congestion relief and pollution reduction.

Marketing the recreational bicycling and hiking areas of Western Loudoun and the County's great access to long distance trails is also an opportunity for strategic promotional activities. Realizing economic benefit from appropriate use of trail and rural road resources can support the County's goals of preserving and protecting the Western Loudoun landscape. Hiking and bicycle touring is a low impact tourist experience that can bring dollars to many small town businesses, villages, rural museums, and other cultural institutions that need support and visitation, but do not desire overwhelming numbers of cars or people.

For transportation as well as recreation-oriented improvements, facility and service development and promotion and marketing need to be coordinated. As Loudoun County develops new facilities, new routes and services, it should schedule and implement promotion of those improvements to ensure early acceptance and

recognition, which will lead to sustained growth in use over time.

The key to successful bicycle and pedestrian promotion activities is to provide staff and financial resources and develop a program that can guide a sustained effort. The same is true for safety education activities. For this reason, this Plan recommends a start up phase (years 1-2) where promotion and safety education activities are merged into one program with combined staff support.

Moreover, stepping-up promotion activities in phases is also recommended--starting with small tasks that with measurable impact and building toward the highest impact programs. An outline of a phased promotion component to the program follows:

**Promotion Component: Bicycle and Pedestrian Promotion and Safety Education Program**

*Year 1: Provide increased support to promotion initiatives that are already underway in Loudoun County and in the region.*

- Increase the intensity of County participation in national/regional Bike to Work Day/Month (each year in May), Walk to School Day (October each year), and the Regional Bike Commuter Assistance Program (ongoing).

*Years 2-3: Initiate small-scale efforts in select neighborhoods and with select populations.*

- Organize community-based rides or walks to promote participation at the neighborhood level and market early improvements.
- Collaborate with chambers of commerce, hotels and other tourist/visitor venues and organizations to promote biking and walking in the county.
- After installation of equipment to transport bicycles on buses, promote awareness of this new service.
- Design and implement a Pedestrian Wayfinding Sign project or Signed Rural Bike Route Demonstration project.

*Years 3-5: Launch Larger Initiatives*

- Develop a bicycle and pedestrian information website.
- Collaborate with an existing non-profit organizations based in Loudoun County or the region that can work effectively with government and the private sector to implement promotional strategies, such as a large-scale bicycle ride or walking event.
- Develop a Bicycle and Pedestrian Suitability map.

### **7.3 Traffic Safety Education**

A significant amount of the public comments received over the course of this planning process expressed a desire for motorists to accord greater respect to bicyclists and

pedestrians who are lawfully using roads and streets in the County. An effective strategy for addressing these problems must use the combined forces of three approaches: engineering, education and enforcement. Engineering approaches to safety and signage are addressed in the Design Toolkit. Education and enforcement are addressed below.

The Citizen Advisory Committee strongly believes that safety education is needed for all road users, but especially for child bicyclists and pedestrians, and young drivers because these efforts will reduce the future needs for adult education. Educating the public about safe walking, bicycling, and driving rules and practices is a major objective of this Plan. Loudoun County is fortunate to realize that safety education and enforcement initiatives are needed well before bicycle and pedestrian fatalities and injuries have reached alarming levels. County action in this area can be an effective preventative measure that can keep this public safety issues from becoming as unfortunate and problematic as it has for surrounding jurisdictions.

As mentioned above, this Plan recommends that the County provide staff and financial resources and develop a safety education program that can guide a sustained effort. It also recommends a start up phase (years 1-2), where promotion and safety education activities are merged into one program with combined staff support.

### **Safety Education Component: Bicycle and Pedestrian Promotion and Safety Education Program**

*Year 1: Provide increased support to promotion initiatives that are already underway in Loudoun County and in the region.*

- Collaborate with regional and state pedestrian and bicycle safety education initiatives already underway.
- Modify beginning-of-the-year safety education activities currently undertaken in Loudoun County Public Schools to include bicycle and pedestrian safety.
- Initiate dialogue with the Board of Education about adopting a bicycle and pedestrian safety education curriculum for Loudoun County Public Schools, and pursue state funding to support implementation of a pilot program.

*Years 2-3: Initiate medium-scale efforts with select populations and for select facilities.*

- Catalogue existing safety-related classes and courses and expand such course offerings by collaborating with local and national organizations with expertise in this area.
- Make bicycle and pedestrian safety educational activities and materials accessible to residents and workers in Loudoun County whose first language is not English.
- Organize outreach and education programs to inform users of the bicycle and pedestrian network how to be safe while traveling and encourage

citizen groups to monitor the trail network on a volunteer basis.

- Educate County law enforcement personnel about traffic safety enforcement issues related to bicyclist and pedestrian safety.
- Coordinate with the Northern Virginia Regional Park Authority (NVRPA) and affected neighborhoods, to explore the potential to light certain segments of the W&OD Trail to enable safe commuting in winter months.

#### *Years 3-5: Maintain and Launch Larger Initiatives*

- See Action items 7d-7h below for possible program activities in future years.

## **7.4 Security and Enforcement**

Maintaining personal security for public activities and in public places is always an important aspect of bicycling and walking. Actual and perceived personal security is a significant factor that influences a person's decision to bicycle or walk, especially for women, and especially during non-daylight hours. Public perception of safety and security in a neighborhood and on public streets is a key component of determining an area's walkability.

One of the single biggest factors that influences security in a public space is the level of use it receives. The greater the numbers of people that are out bicycling and walking on

streets, sidewalks and trails, the safer they will be. The best deterrent to crime on streets and trails is the likelihood that it will not go unnoticed. Now that many people routinely carry mobile phones, quick access to authorities is usually available where ever people are out and about. Professional police patrols and volunteer neighborhood patrols provide formal support to the base of security that results from regular use.

Information shared by the Loudoun County Sheriff's Office for this Plan provides good background about current security trends and enforcement practices. County law enforcement officials are responsible for policing the W&OD Trail. Despite use increasing over the past ten years on this trail, both the Sheriff's Office and managing agency (NVRPA) report few problems with crime or other incidents on the trail. The W&OD trail has seen very few serious crimes over its 40 plus miles, and in Loudoun County especially. Nonetheless, a few incidents in the past have received a large amount of media coverage and raised community concerns.

Sheriff's Office patrol resources include a number of police cruisers with bicycle racks and bicycles, and officers who have received bicycle patrol training. The W&OD Trail is sometimes patrolled by officers on bicycles, and is accessible to police cruisers as well. Bicycle patrols are also used sometimes on community policing beats in Eastern Loudoun.

To ensure a sufficient level of personal safety and security on Loudoun’s Bicycle and Pedestrian network will require application and coordination of a variety of approaches. They should be targeted to the areas where problems are most likely to occur. These approaches will include the following (specific actions are listed in the next section):

- application of the principals and techniques commonly referred to as Crime Prevention Through Environmental Design (CPTED), including strategic approaches to landscaping, lighting, berming and other design issues.
- ensuring proactive facility management including proper signage and adopting and communicating rules for facility use and etiquette.
- installation of emergency response technology as needed, such as call boxes.
- designing facilities such as off-road paths, trail access points and bridges such that access for emergency response vehicles and personnel is not precluded.
- providing adequate levels of professional law enforcement throughout the various settings of the Network.
- supplementing professional law enforcement with volunteer and community-based patrols.

## 7.5 Recommended Actions

The following actions are recommended to achieve the education, promotion, safety and security goals and objectives of the Plan:

**Action 7a: An ongoing citizens bicycle and pedestrian advisory body (see next chapter for details) should develop a strategic media outreach initiative to educate and promote the Plan to various constituencies within the County.**

**Action 7b: A field visit should be conducted and led by the advisory body to educate public officials and community leaders about the Plan and the benefits of bicycling and walking.**

**Action 7c: Initiate a combined Bicycle and Pedestrian Promotion and Safety Education Program by providing for one FTE of staff support and a \$50,000 per year budget.**

**Action 7d: Encourage the Board of Education to adopt a bicycle and pedestrian safety curriculum for use in K-5 and request state funding to initiate a Bicycle and Pedestrian Safety Education Pilot Project.**

**Action 7e: Encourage the Board of Education to evaluate the Driver’s Education Curriculum**

currently used in the Loudoun County Public School system, and recommend appropriate changes.

**Action 7f:** Adopt an ordinance requiring distribution of bicycle and pedestrian safety education materials at the time of home purchase and/or home or apartment lease; when a bicycle is purchased, and/or at child pediatric visits;

**Action 7g:** Develop a system of changeable message signs at 1-3 select locations on major highways to use primarily for communicating bicycle, pedestrian and motor vehicle traffic safety messages.

## Chapter 8: Recommended Institutional Framework

Improving conditions for bicycling and walking in Loudoun County will require a sustained effort. Because this is the County's first Plan in this area the institutional resources to guide this effort are not yet in place. This section of the Plan recommends key actions that will begin the process of building institutional capacity to implement a multi-dimensional bicycle and pedestrian program.

### 8.1 Permanent Citizen Advisory Body

The Plan Citizens' Advisory Committee studied the question of establishing a permanent advisory body and concluded that doing so would be key to ensuring success of the plan. A body of Citizens able to educate, advise and act in formal relationship to County government is a common and proven approach for the advancement of bicycling and walking. It is used in jurisdictions across the country at all levels of government. In Loudoun it should include citizen representatives from all parts of the county and each incorporated Town; it should also be representative of the variety of users of bicycle and pedestrian facilities.

This body should be charged with the following tasks:

- Oversee implementation of the Bicycle and Pedestrian Mobility Master Plan, and report annual progress toward Plan completion.

- Advise the Board of Supervisors, Planning Commission, and County agency staff, regarding County policy and planning efforts with regard to their relationship to and impact on bicycling, walking and non-motorized travel.
- Maintain liaison with the Interdepartmental Bicycle and Pedestrian Committee.
- Oversee periodic Plan updates (potentially every 3 years).
- Review the annual workplan of the bicycling and walking program, prioritize implementation tasks and develop list of priority projects.
- Review current and proposed VDOT and County capital improvement programs to ensure that bicycle and pedestrian needs are incorporated into planning, design and construction of projects when and where appropriate.
- Provide a forum for the public to identify needs and concerns of bicyclists and pedestrians, and opportunities for improving safety and access, or implementing educational programs.
- Recommend and help implement education, promotion and safety programs.
- Facilitate partnerships with the private sector to involve them in program implementation noted above as well as facility funding, construction and maintenance, where appropriate.
- Maintain liaison with other County advisory bodies that address issues of common concern.

For the first two years, this Plan recommends that the Planning Department and Office of Transportation Services jointly staff this body. Staff from other County agencies should support the committee in its work as required.

## **8.2 Program Implementation and Staffing**

The most successful local jurisdictions to implement bicycle and pedestrian programs have hired staff with professional training in the area of bicycle and pedestrian transportation or related field. However, other communities have started programs by identifying interested existing staff and providing significant support in the early years toward professional development and training. Still others have developed successful programs by providing minimal core staff and utilizing consultants to accomplish specific program activities. In any case, it is critical to identify and dedicate a meaningful measure of staff resources to the program.

Because a range of tasks and types of expertise will be needed to implement this Plan, a team of dedicated staff working part-time on these issues may be able to be as effective as assigning the entire job to one or two people. Rather than recommend a particular approach to staffing, this Plan offers a list of the specific tasks that will need to be undertaken at the staff level.

### **Program Implementation Tasks**

- Provide ongoing technical support to various staff and the Citizen Advisory Body (CAB) regarding use and maintenance of the Level of Service database, and implementation of the Level of Service Policy.
- Coordinate and implement bicycle and pedestrian safety education priorities and programs identified in the Plan.
- Coordinate and implement bicycle and pedestrian promotion programs, in conjunction with the CAB.
- Oversee and provide technical support to staff involved in review of development plans to ensure proper inclusion of bikeways and walkways and related facilities.
- Coordinate with VDOT staff to:
  - ensure a thorough orientation to, and education about, the Plan.
  - initiate and maintain discussions around proposed new bikeway and walkway design standards.
  - initiate special joint VDOT/County studies identified in the plan related to intersections, interchanges, traffic calming and other issues.
  - provide ongoing communication about the various plan priorities and actions to the appropriate departments, offices and staff within VDOT.
  - identify and discuss budgetary and resource allocation opportunities and implications and prepare annual funding requests.
  - to ensure that location specific, roadway improvement planning studies properly

address bicycle and pedestrian needs and considerations.

- Review new roadway design and construction plans and roadway improvement project designs to ensure proper treatment of bicycle and pedestrian facilities.
- Provide staff support to the CAB
- Provide staff support to the ICC

**Interdepartmental Bicycle and Pedestrian Coordinating Team**

In addition to ensuring that specific initiatives and ongoing tasks receive the attention needed, there will be a need for staff and agencies to coordinate their efforts. An Interdepartmental Advisory Team was convened by the Planning Department for this project, and proved to be very effective at involving different county agencies and ensuring that all perspectives on issues were considered. The staff that participated in this group were also a valuable source of information about existing programs and issues that are central to bicycling and walking. It should be continued and expanded.

This Plan recommends formalizing and continuing this group as the Interdepartmental Bicycle and Pedestrian Coordinating Team (IBPT).

**8.3 Progress Assessment and Reporting**

While the concepts of assessing and reporting progress are imbedded in the tasks of the CAB and the staff, it is important to establish a framework for reporting that can be used to ensure successful implementation of the Plan. There are some assessment and reporting procedures that will need to be made routine. These include refreshing and updating the Level of Service database, prioritizing and budgeting for program initiatives and projects, periodic updating of the Plan, training staff and citizen advisors, and reporting on progress and achievements. These tasks may have resource implications as well and will need to be budgeted for. A general timetable for these activities is provided below.

| <b><u>Program Maintenance Task</u></b>                   | <b><u>Frequency</u></b>              |
|--|--------------------------------------|
| Update and refresh Level of Service database.            | Every 2 years.                       |
| Program budgeting and prioritizing projects for funding. | Annually                             |
| Updating the Plan.                                       | Every 5 years.                       |
| Reporting on progress and achievements.                  | Annually, to the BoS and the public. |
| Training staff and advisory committee members.           | One session offered annually.        |

## 8.4 Recommended Actions

The following actions are recommended to achieve the institutional objectives of the Plan:

- Action 8a:** The Board of Supervisors should appoint and charge a permanent bicycle and pedestrian advisory body, and direct the appropriate County agency(s) to provide staff resources to support the committee's work.
- Action 8b:** The Board of Supervisors should provide direction to the County Administrator (and appropriate Department Directors) with regard to staffing strategies that should be used to launch implementation of the adopted Plan. The Board should provide funding authority to support its staffing strategies.



# Chapter 9: Funding and Implementation Plan

## 9.1 Funding Recommendations

Developing a sustainable source of funding is necessary to budget for and implement construction and maintenance of walkways, bikeways and related facilities and programs. Use of Federal, State, County and Town transportation dollars will be necessary. To a small degree funds from budgets outside of the transportation agencies (Parks, Schools, etc.) can be used to supplement transportation funds, especially when the project has a strong relationship to the mission of other agencies. Private sources of funding from proffers and impact fees will also be key. Contributions from foundations and local business will also be important, primarily for safety education and promotion programs or small-scale physical improvements.

The following nine recommendations provide a strategy for developing a sustainable and growing source of revenue for Loudoun's bicycle and pedestrian projects and programs.

(For detailed information about funding program guidelines, cycles, project/program eligibility, a list of references is provided at the end of this chapter.)

**Action 9a: Establish and dedicate an ongoing source of local revenue to provide a funding base and source of matching funds for the bicycle and pedestrian program.**

This funding will be used to fund all types of activities including education, promotion, enforcement, planning and construction and maintenance of facilities. It will be used to fully fund certain activities, but also as matching funds to leverage a wide variety of other sources, including VDOT funds, federal transportation funds, non-transportation funding sources and grants from private foundations. An amount of \$500,000 annually is recommended for the first 1-2 years, with eventual increases to \$2-3 million.

### **Potential Sources for Local Funding Base:**

- County General Fund Revenue
- Local Gas Tax
- Use 0.5 -1.0 percent of the 5 percent Transient Occupancy Tax
- Annual VDOT allocation for the County's Secondary Roads Program
- Business Professional and Occupancy License Revenue (may require special legislation)
- Bond Referendum (many communities across the nation have had success in this area)
- Local Sales Tax (a number of communities have included set-asides of a portion of local sales tax for transportation or "alternative" transportation.)
- HUD Community Development Block Grants

- Or use one of the innovative funding measures noted in CTP policy #1: special taxing districts, Community Development Authorities (CDAs).

**Action 9b: Develop a coordinated and aggressive strategy for utilization of Federal Transportation funding programs that are most compatible for bicycle and pedestrian projects, including the Transportation Enhancements Program, the Recreational Trails Program, the Scenic Byways Program, Section 402 Safety Program and the Hazard Elimination Program.**

A specific strategy will need to be developed for each program based on the funding cycles, project eligibility, and amounts of funding that are generally available. Most of these programs are administered by VDOT. The Scenic Byways Program is a national discretionary grant program, but states must sponsor local applicants, and the Recreational Trails Program is administered by the Virginia Department of Conservation and Recreation.

**Action 9c: Where there is overlap with programmed roadway improvements, integrate bicycle and pedestrian facilities identified in this plan into projects already listed in the Virginia Transportation Six-Year Program (VTP) and the Secondary Roads Program for Loudoun County.**

Also, insure that future updates of the VTP include needed bicycle and pedestrian facilities. These may be in

conjunction with road improvements or as independent projects.

- Take advantage of new VDOT policy, as of 12/19/02, which allows routine VDOT road construction funds to be used for independent bicycle facility projects, i.e. those that are not a part of a larger road improvement project.
- Existing VDOT policy allows local jurisdictions to request inclusion of bicycle and pedestrian facilities as a part of requested road improvement projects on the Primary System, Secondary System or Urban System. Local jurisdictions must share the construction costs with VDOT 50% / 50%, however, VDOT will fund 100 percent of additional preliminary engineering and right-of-way costs that result from adding the bikeway elements. Cost Sharing for Urban System projects are the same for the bicycle facility costs as for regular road improvement projects.
- Procedures for local jurisdictions to fund walkways and bikeways in this manner are detailed in both the VDOT Bicycle Facility Resource Guide and in the Loudoun County Revised Countywide Transportation Plan.

**Action 9d: Identify candidate projects to Congressional Representatives for funding through TEA-3 High Priority funding sources and/or annual Federal appropriations bills.**

This funding strategy is ideal for projects that have widespread community support, are high profile, have

higher costs, or are related to other large federally-funded transportation or other projects. Some examples include:

- The proposed trail in conjunction with the Metrorail Extension to Dulles Airport and Loudoun County.
- A new bicycle/pedestrian bridge over Route 7 in the Cascades Town Center area.
- Improvements to W&OD Trail/Road Intersections and points of access.
- The proposed trail around Dulles Airport

This funding strategy is also recommended as a way to access the Transportation and Community and System Preservation Pilot Program (TCSP) of TEA-21. This program is oriented to “cutting-edge” transportation projects with an orientation toward pollution reduction, single occupant auto trip reduction and other community benefits.

**Action 9e: Identify candidate projects for funding requests through the Transportation Coordinating Council of Northern Virginia.**

These projects would be those most suited for funding through the federal Surface Transportation (STP) and Congestion Mitigation and Air Quality Improvement (CMAQ) programs, and other VDOT funding programs where the Metropolitan Planning Organization coordinates the programming of available funds.

**Action 9f: Modify policies that govern existing local transportation funding sources to ensure that they can be used for bicycle and pedestrian facilities and programs.**

The CTP has a chart summarizing Funding Sources by Facility Type (Chapter 5, page 7). A number of important funding sources are not checked for bicycle or pedestrian facilities. However, CTP policy statements reference use of a number of these funding sources for alternative transportation modes. If necessary, legislative or policy changes should be made to ensure that the following funding sources can be used to fund bicycle and pedestrian facilities and programs: Business Professional and Occupancy License (BPOL), Local Gasoline Tax, Special Tax Districts, and Impact Fees.

**Action 9g: Ensure that the revenue stream generated by the Public Private Partnership created for the Route 28/Dulles Airport area to fund the Route 28 improvements provides full funding of bicycle and pedestrian facilities on all roads and bridges crossing Route 28 and going through interchanges with Route 28.**

Additionally, this funding source should be used for the bikeways planned for Atlantic and Pacific, which were selected by the County as alternates to providing an off-road bikeway in the Route 28 corridor.

**Action 9h: Utilize other potential funding sources, including the following:**

- **State Revenue Sharing**
- **State Recreational Access Funds**
- **Virginia Tourism Corporation (Cooperative Marketing Fund or the Matching Grants Marketing Program)**

**Action 9i: Request funding from private sources, develop public/private partnerships and encourage the formation of a local non-profit organization that can seek and receive funding from private foundations.**

Some key funding sources and strategies include the following:

- The Bikes Belong Coalition (The Bicycle Industry's Advocacy Funding Arm)
- Large, locally-based corporations.
- Targeted community- or project-based fundraising efforts.
- Develop Partnerships with Individual Home Owner Associations.

## **9.2 Funding Source References**

- *The Virginia Bicycle Facility Resource Guide*, Chapter Four: Funding, VDOT, 2001
- *The Revised Countywide Transportation Plan*, Chapter Five: Funding, Loudoun County, 2001
- *VDOT Policy Relative to Bicycle Facilities*, VDOT, 2002

- *BicyclingInfo.org* or *walkingInfo.org* – national websites providing the most comprehensive information sources regarding bicycle and pedestrian planning.
- *A Citizen's Guide to Transportation Decision-Making in the Washington Metropolitan Region*, National Capital Region Transportation Planning Board, 2000.

## APPENDIX A: Glossary of Terms

The following terms and definitions are provided for the readers of the Loudoun County Bicycle and Pedestrian Mobility Master Plan. This glossary was originally developed and used throughout the planning process to help CAC members, IDAT representatives and members of the public to develop a common language for discussing bicycle and pedestrian issues.

**Accessible Pedestrian Signal (APS)** – A device that communicates information about pedestrian signal timing in non-visual format, through the use of audible tones (or verbal messages) and vibrating surfaces.

**Americans with Disabilities Act (ADA)** – The 1990 Federal law establishing the civil rights of people with disabilities. Prohibits discrimination against people with disabilities and requires common places used by the public to provide an equal opportunity for access.

**Bicycle** – Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term “bicycle” in this planning process also includes three and four-wheeled human-powered vehicles, but not tricycles for children.

**Bicycle Facilities** – A general term denoting a variety of improvements and provisions that are made by public agencies to accommodate or encourage bicycling, including bike lanes, shared-use pathways, signed bike routes, bicycle parking racks and storage lockers. The term *Facility* is also used to refer to elements of pedestrian transportation infrastructure such as sidewalks, curb ramps, crosswalks, paths and trails. It is frequently used in the phrase “bicycle and pedestrian facilities.” Sometimes the term *accommodation* is used in a similar manner. On a broader scale, the term *facility* is well accepted and commonly used in the transportation industry to refer collectively to the various types of infrastructure that make up transportation systems: including roads, highways, bridges, tunnels, railroad lines, busways, transit centers, metro stations, etc.

**Bicycle Network** - a system of public bicycle facilities that can be mapped and used by bicyclists for transportation and recreational purposes.

**Bikeway** – A generic term for any road, street, path, trail or way, that in some manner, is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

**Bike Lane** -- A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

**Buffer** – That portion of a highway, road or street between the curb-face or edge of the pavement and the sidewalk that provides a spatial buffer between vehicular traffic and pedestrians on sidewalks. Buffers often include landscape plantings such as grass, trees or shrubs, or utility poles, and may also be referred to as the “planting strip,” “landscape buffer,” “tree buffer” or “tree boxes.” Buffers can also include barriers such as highway guide rails (guardrails) or bollards. In rural or suburban areas the buffer may be a grassy swale or drainage ditch. In urban areas, downtowns, or on “Main Streets” the buffer may also include street furniture, street signs, fire hydrants, vending boxes, lighting poles, etc.

**Crosswalk** – The horizontal portion of roadways, usually at intersections, reserved for pedestrian crossing; it may be marked or unmarked. Three marking patterns using white striping are most common: 1) Double Parallel lines, 2) “Zebra Stripes:” white cross hatches perpendicular to the pedestrian direction of travel, or 3) “Ladder:” perpendicular white cross hatches combined with double parallel lines on the outside edges.

**Curb Ramp** – A combined ramp and landing to provide access between street level and sidewalk level, usually at intersections or designated crosswalks. ADA accessible ramps must achieve particular design requirements

including a running grade no steeper than 1:20. Curb ramps are intended to provide street/sidewalk access to all types of pedestrians, as well as bicyclists who maybe legally using the sidewalk or crosswalk.

**Detectable Warning** – A standardized surface feature built in or applied to walking surfaces or other elements to warn people who are blind or visually impaired of specified hazards.

**Median Refuge** – An area within an island or median that is intended for pedestrians to wait safely away from travel lanes for an opportunity to continue crossing the roadway.

**Midblock Crosswalk** – A legally established crosswalk that is not at an intersection.

**Pedestrian** – A person walking or traveling by means of a wheelchair, electric scooter, crutches or other walking devices or mobility aid. Use of the term pedestrian is meant to include all disabled individuals regardless of which equipment they may use to assist their self-directed locomotion (unless they are using a bicycle). It also includes runners, joggers, in-line skaters, those using push scooters, those pulling or pushing strollers, carriages, carts and wagons, and those walking bicycles.

**Pedestrian Access Route** – A corridor of accessible travel through the public right-of-way that has, among other properties, a specified minimum width and cross slope.

**Pedestrian Crossing Interval** – The combined phases of a traffic signal cycle provided for a pedestrian crossing in a crosswalk, after leaving the top of a curb ramp or flush landing, to travel to the far side of the vehicular way or to a median, usually consisting of the WALK interval plus the pedestrian clearance interval.

**Pedestrian Signal Indication** – The illuminated WALK/DON'T WALK message (or walking person/hand symbols) that communicates the pedestrian phase of a traffic signal, and their audible and tactile equivalents.

**Shared Roadway** – A roadway that is open to both bicycle and motor vehicle travel. Unless bicycle travel is explicitly prohibited, all highways, roads and streets are “Shared Roadways.” Some Shared Roadways may have wide curb lanes (14’ or greater) or paved shoulders, to increase comfort for bicyclists; however in most cases these roads do not have sufficient width to accommodate a Designated Bike Lane.

**Shared Use Path** (or Pathway) -- A bicycle and pedestrian path separated from motorized vehicular traffic by an open space, barrier or curb. Shared-Use Paths may be within the highway right-of-way (often termed “sidepath”) or within an independent right-of-way, such as on an abandoned railroad bed or along a stream valley park. Shared use paths typically accommodate two-way travel and are open to pedestrians, in-line skaters, wheelchair users, joggers and other non-motorized path users. They are typically surfaced in asphalt or concrete, but may have hard-

packed/all weather gravel or dirt surfaces as well. To safely accommodate a range of users, Shared Use Paths should be a minimum of 10’ wide (or 8’ in very constrained conditions)

**Signed Shared Roadway** (Signed Bike Route) – A shared roadway that has been designated by signs as a preferred route for bicycle use.

**Sidewalk** – That portion of a highway, road or street specifically constructed for the use of pedestrians on the outside edge of the vehicular travel way. Sidewalks are typically, but not always, curb-separated from the roadway and made of concrete, brick, asphalt or another hard surface materials.

**Shoulder** -- Any portion of a roadway to the right of the right-most travel lane, but not including curbs, planting buffers and sidewalks. Shoulders can have a variety of surface treatments including pavement, gravel or grass. Depending on their width and surface, they serve a variety of purposes, including providing space for vehicles to slow and turn right, accommodation of stopped or broken-down vehicles, to allow emergency vehicles to pass, for structural support of the roadbed, or for bicycle and pedestrian travel.

**Trail** – The word “trail” has come to mean a wide variety of facilities types, including everything from a “*marked or beaten path, as through woods or wilderness*” to a paved

*“multi-use trail”* such as the W&OD rail-trail. The same word “trail” is used to describe hiking trails, equestrian trails, Indian trails or even tourist-oriented driving routes such as Virginia’s Civil War Trails. For this reason, this planning process will not use the word “trail” to reference a facility intended for bicycle transportation. We urge use of the term *Shared Use Path* in place of *Multi-Use Trail*.

**APPENDIX B:  
Members of the Citizen Advisory  
Committee**

## APPENDIX C: Bicycle and Pedestrian Level of Service Models

The Bicycle and Pedestrian Level of Service models (BLOS / PLOS) are an evaluation of bicyclist and pedestrian perceived safety with respect to motor vehicle traffic and comfort in using the roadway corridor. It identifies the quality of service for bicyclists or pedestrians that currently exists within the roadway environment. Following the description of these models, the data requirements and data collection and compilation guidelines are also provided.

### 1) Bicycle Level of Service Model

The statistically calibrated mathematical equation entitled the *Bicycle Level of Service (Bicycle LOS)<sup>5</sup> Model (Version 2.0)* will be used for the evaluation of bicycling conditions in the Loudoun. This model is the most accurate method of evaluating the bicycling conditions of shared roadway environments. It uses the same measurable traffic and roadway factors that transportation planners and engineers use for other travel modes. With statistical precision, the *Model* clearly reflects the effect on bicycling suitability or “compatibility” due to factors such as

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<sup>5</sup> Landis, Bruce W. et.al. “Real-Time Human Perceptions: Toward a Bicycle Level of Service” *Transportation Research Record 1578*, Transportation Research Board, Washington DC 1997 (see Appendix B for a copy of the research paper).

roadway width, bike lane widths and striping combinations, traffic volume, pavement surface conditions, motor vehicle speed and type, and on-street parking.

The *Bicycle Level of Service Model* is based on the proven research documented in *Transportation Research Record 1578* published by the Transportation Research Board of the National Academy of Sciences. It was developed with a background of over 150,000 miles of evaluated urban, suburban, and rural roads and streets across North America. Many urban planning agencies and state highway departments are using this established method of evaluating their roadway networks. These include Anchorage AK, Baltimore MD, Birmingham AL, Buffalo NY, Gainesville FL, Houston TX, Philadelphia PA, Lexington KY, Sacramento CA, Springfield MA, Tampa FL, as well as the Delaware Department of Transportation (DelDOT), Florida Department of Transportation (FDOT), New York State Department of Transportation (NYDOT), Virginia Department of Transportation (VDOT) Maryland Department of Transportation (MDOT) and many others.

Widespread application of the original form of the *Bicycle LOS Model* has provided several refinements. Application of the *Bicycle LOS Model* in the metropolitan area of Philadelphia resulted in the final definition of the three effective width cases for evaluating roadways with on-street parking. Application of the *Bicycle LOS Model* in the rural areas surrounding the greater Buffalo region resulted in refinements to the “low traffic volume roadway width adjustment”. A 1997 statistical enhancement to the *Model*

(during statewide application in Delaware) resulted in better quantification of the effects of high speed truck traffic. As a result, *Version 2.0* has the highest correlation coefficient ( $R^2 = 0.77$ ) of any form of the *Bicycle LOS Model*.

Version 2.0 of the *Bicycle Level of Service Model (Bicycle LOS Model)* has been employed to evaluate collector and arterial roadways within Loudoun County.

## **2) Pedestrian Level of Service Model**

Similar to the evaluation procedure used for the bicycle model, this is an evaluation of pedestrians' perceived safety with respect to motor vehicle traffic and comfort in using the roadway corridor. It identifies the quality of service for pedestrians that currently exists within the roadway environment.

The *Pedestrian Level of Service (Pedestrian LOS) Model* was used for the evaluation of walking conditions on road and street corridors in Loudoun County. This model is the most accurate method of evaluating the walking conditions within shared roadway environments. Like the Bicycle Level of Service Model, it is based on the proven research documented in *Transportation Research Record 1773* published by the Transportation Research Board of the National Academy of Sciences<sup>6</sup>. It uses the same measurable traffic and roadway factors that transportation planners and engineers use for other travel modes. With statistical precision, the *Model* clearly reflects the effect on walking suitability or "compatibility" due to

factors such as roadway width, presence of sidewalks and intervening buffers, barriers within those buffers, traffic volume, motor vehicles speed, and on-street parking.

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<sup>6</sup> Landis, B.W., V.R. Vattikuti, R. M. Ottenberg, D.S. McLeod, M. Guttenplan. "Modeling the Roadside Walking Environment: Pedestrian Level of Service," *Transportation Research Record 1773*, Transportation Research Board, National Academy of Sciences, 2001.

## APPENDIX D: Level of Service Policy – Explanation of Table 2

As explained in Chapter 4, the Bicycle and Pedestrian Level of Service models used for this Plan provide a method of evaluating the comfort level of bicyclists and pedestrians on any given roadway segment. The Level of Service models are tools that can be used in a variety of ways--to assess existing conditions, to help prioritize investments in the bicycle and pedestrian network, to explore the effectiveness of facility design options and to establish level of service standards for roadways. This Chapter recommends adoption of a countywide bicycle and pedestrian level of service standard. It shall be used to guide both roadway and land development decisions, to ensure that optimum performance of the transportation system is achieved for the bicycling and pedestrian modes.

### In What Cases do Level of Service Standards Apply?

- a) **Planning and Design of Land Developments** (Condition 1 in Table 2): when development proposals are required to evaluate and describe their impacts on existing and future motor vehicle levels of service, they shall also be required to evaluate their impacts on existing and future bicycle and pedestrian level of service. Projects shall be required to mitigate negative impacts to bicycle and pedestrian transportation by making roadway improvements that retain acceptable minimum LOS, or improve existing bicycle and pedestrian levels of service per the minimums described in Table 2. Other mitigation methods may also be considered, including 1) paying impact fees into a County fund that will be used to implement bicycle and pedestrian improvements or 2) providing improvements that create public bicycle and pedestrian access across the site via shared use paths that contribute to the public bicycle and pedestrian transportation network.
- b) **Planning and Design of New Roads** (Condition 1 in Table 2): When new road and streets are being planned on new rights-of-way (such as CTP roads or streets within new developments), they will be designed and constructed to achieve a Level of Service meeting or exceeding that for Condition 1 in Table 2. Exceptions may be considered as per Table A and the exceptions listed below.
- c) **Planning and Design of Improvements to Roads and Streets in Select Policy Areas** (Condition 2 in Table 2): Within the following Policy Areas, when improvements are planned for existing highways, roads and streets, they should be designed and built to achieve the highest level of bicycle and pedestrian service possible and shall not result in LOS below the minimums listed for Condition 2 in Table 2.
  - All Suburban Policy Areas

- All Transition Policy Areas
  - All Joint Land Management Areas
- d) **Planning and Design of Improvements to Select Roads and Streets in the Rural Policy Areas** (Conditions 3-3b in Table 2): Within the Rural Policy Areas, when improvements are planned for existing roads that are included in the Rural Network, as defined by this Plan, they should be designed and built to achieve the bicycle and pedestrian levels of service minimums described in Condition 3, and 3a-b in Table 2. The design of bikeways and walkways along these roads will take into consideration safety, heritage resources, topography, available right-of-way, and various user groups.
- e) **Planning and Design of All New Roads and Improvements to Existing Roads Near Schools:** Conditions 2a and 3c describe the areas around schools that should be improved to maximize both the number of students that can walk or bicycle to and from school while ensuring their safety using the road and street system.
- f) **Planning and Design of Improvements to Roads and Streets in Incorporated Towns, where Towns have adopted LOS minimums.** It is recommended in this Plan that the Towns of Leesburg, Purcellville, Lovettsville, Round Hill and Hamilton adopt the LOS standards detailed in Conditions 1, 2 and 2a in Table A. Other Towns are encouraged to adopt these same LOS standards or those described in Condition 3b.

#### On What Roads Do Level of Service Standards Apply and Not Apply?

Generally, LOS standards apply to all roads whose functional classification ranks between residential street and limited access highway, with some exceptions and caveats, see the following.

- a) They do not apply on Limited Access Highways where VDOT or County policy does not allow bicycle or pedestrian access, including the Dulles Greenway. If future limited access highways are planned for Loudoun County, the need for bicycle and pedestrian access along the new highway should be considered as part of the early planning for the road and a determination made regarding the provision of bicycle and pedestrian facilities as a part of the road or road corridor.
- b) LOS standards do apply to the Route 15 Bypass in Leesburg from Route 7 north to its merger with Route 15 King Street. Moreover, while LOS standards do not need to be applied to the Route 7 Bypass in Leesburg, as per CTP policy bicycle and pedestrian accommodations should be considered in this corridor.
- c) LOS standards do not apply to unpaved roads that by policy are to remain unpaved in their ultimate conditions, nor do they apply to alleys, short cul-de-sacs, and private roads.
- d) LOS standards apply only to those roads in the Rural Policy Areas that are identified in this plan as part of the Bicycle and Pedestrian Network.

- e) While LOS grades are not currently available for all existing residential streets and minor commercial streets, LOS standards do apply to these functional classifications of roads.

#### Making Exceptions to Level of Service Minimum Standards

In general, exceptions to the minimum Level of Service can be made for extenuating circumstances. Some or all of the following factors may be appropriate to consider when seeking a LOS exception under Conditions 1, 2, 3b listed in Table 2.

- what is physically feasible given environmental and built constraints, including heritage resources, topography, available right-of-way, etc.
- what is appropriate given adjacent land uses,
- for BLOS exceptions, if there are parallel routes that meet minimum BLOS on nearby roads or trails that serve the same transportation connections with a similar level of directness and convenience.
- how various design alternatives impact and balance each mode's quality of service and safety,
- what the public desires,
- what is cost effective.

**APPENDIX E:  
Facility Maintenance Schedule**

**APPENDIX F:  
Pedestrian Improvement Areas: Methodology and List**

# **APPENDIX G: Case Studies**